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SCURVY: A REVIEW.

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It was in 1920 that scurvy as a disease was given a separate heading in the *Tropical Diseases Bulletin*, and its inclusion was justified by the fact that as a consequence of the war and the hardships inseparable from it a truly enormous number of cases were reported from sub-tropical and tropical areas, particularly from the campaigns in Mesopotamia and Africa.

There is no doubt that within recent years our conception of scurvy has come to include much more than the old-fashioned type of ship's scurvy, important though this is. Year after year the close affinity of this disease with other diseases associated with a deficient food supply and inefficient metabolism has been demonstrated, for from true scurvy we pass in one direction to ship scurvy, Rand scurvy, and beriberi, and in the other direction we find infantile scurvy (Barlow's disease) merging into rickets. This more comprehensive and more interesting conception has led to an enormous amount of experimental work, with a plethora of papers of international range, offering light on etiology, etc. There are still some who bring forward evidence of an infective origin [PESCHIĆ (1923), MESSERSCHMIDT (1919), and LIND (1919)], but the deficiency theory of a want of vitamin C is most generally accredited, though, as shown by Hans ABELS (1919, 1920), McCARRISON (1920) and many others, a secondary intestinal infection may play a very important part. The more lengthy papers of VEDDER (1921, 1922), HOPKINS (1921) and HESS (1920,1921) on the etiology of the disease are all of great importance, particularly those founded on the clinical observations on hospital children by HESS, and those of the devoted workers at the children's clinic in Vienna (CHICK and DALYELL (1920), and others). Reports relating to the outbreak of scurvy in the European forces in Mesopotamia (over 11,000 cases) by WILLCOX (1920), HEHIR (1919), and SHEPPARD (1920), show how the disease was definitely dependent upon a faulty dietary often under excessive hardship and how recognized and cured, and describe the prophylactic measures adopted, such as the use of germinating beans

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and peas and the cultivation of vegetables in the occupied area. SHEPPARD showed how superior raw potato (as salad) was to the fresh prepared lime-juice received from Bombay, and the uselessness of ordinary West Indian lime juice is now well realized. In Africa MACVICAR (1920) showed that the incidence of scurvy was highest in natives, many of whom were often in a pre-scurvy condition on arriving at the Rand.

The outbreaks of scurvy in the latter years of the war and after, in Northern Russia, chiefly in the prisons, are vividly described by STEVENSON (1920), COMRIE (1920) and BIERICH (1919); they all teach that a history of previous debilitating disease or a condition of mental depression not only increases the incidence but also shortens the incubative period (from the usual 4 to 5 months to less than 3 months, even to 1 month) and confirm the great curative value of fresh lemon-juice, germinating peas, and fresh meat. In describing the extensive outbreaks of scurvy in Southern Roumania during the winter and the spring of 1918 NICOLAU (1919) emphasizes the occurrence of a papular haemorrhagic rash as a diagnostic sign in both pre-scurvy and developed scurvy cases; other early signs are swelling of the pinna [SHEASBY (1921)], night blindness with anaemia, pains, and bleeding gums [PICARD and LLOYD (1920)]. Among the Serbian troops WILTSHIRE (1919) observed in 87 per cent. of 3,000 cases a hyperkeratosis of the hair follicles. HESS (1920), in a survey of the Great War, shows how scurvy was present in the armies of all nationalities, except the American, who were in the field only a short time; frequently cases were not recognized, or were described as infective purpura, etc., but in the general shortage the various nutritional diseases due to want of particular food-factors became very difficult to discriminate, especially Barlow's disease or infantile scurvy, war oedema, and beriberi. Among the most noteworthy new methods of treatment is that of DONALDSON (1923), who injected intravenously strained orange-juice brought to a faintly acid reaction with NaOH (1 in 10) and diluted with normal saline. DONALDSON favours an initial dose of 10 cc. increasing by 5 cc. up to 25 or 30 cc. given daily or on alternate days. The Kaffir beer used in South Africa was believed to have little curative effect by VAN DRIEL (1922), though DELF (1921) and others have reported that the quickly fermented variety has some antiscorbutic power. The antiscorbutic value of tomatoes for prevention and treatment is of great importance, especially as it is not impaired by tinning. (HESS & UNGER (1919), BASSETT-SMITH (1921), GIVENS & MCCLUGAGE (1921).)

Infantile scurvy and Barlow's disease.—It is quite natural that the scurvy of infants has been a source of much investigation, for in times of privation infants are bound to suffer very severely (1) from unhealthiness of the mothers, (2) from insufficient food, often imperfect in quality and overcooked. In Vienna, as shown by CHICK & DALYELL (1919) and others, even in the hospitals where great attention had been directed to the hygienic surroundings and a sufficiency of calories in the daily diet (VON PIRQUET'S hospital), scurvy and associated rickets were very prevalent, but disappeared on an altered diet containing abundant antiscorbutic juices and fat-soluble vitamin.

WEILL & DUFOURT (1919) describe 9 cases in recently repatriated children which were diagnosed as enteritis and were rapidly cured by lemon juice. FABER (1921) suggests that the use of sodium citrate may destroy the antiscurvy properties of raw milk and quotes a case.

HESS and others have shown that the amount of antiscorbutic vitamin in raw milk, never very large, varies enormously with the condition and the feed of the cows from which it is obtained, as also does mother's milk from the same causes. GIORGI (1921), who found that in Italy among the breast-fed infants of the poorer classes the disease is uncommon, but is much more frequent in the middle classes, describes an epidemic of Barlow's disease (or latent infantile scurvy—which he considers to be pathologically identical) in Venice (1919–20), due to the supply of a specially prepared form of milk. This "milk of Soresina" was supplied in very large quantities from April 1918 to April 1920; it was not only insufficient in quantity for the returning population, but it was deficient as a food, and was undoubtedly the chief cause of the epidemic. He concluded from his experience that the infants of the very poor suffer most from inanition, rickets and scurvy, while in those of the better classes the condition is more that generally recognized as Barlow's disease. There is almost unanimity of opinion that the early replacement of mother's milk by proprietary preparations is one of the most fertile sources of infantile scurvy. THURSFIELD (1922) particularly condemns dried milk, which should always be supplemented with fresh orange-juice. The method of drying the milk is, however, of great significance. AIKMAN (1921), and MIYAKI in Japan, found that prolonged use of condensed, boiled, or pasteurized milk caused infantile scurvy, giving rise to latent, mild or severe types of the disease. A condition described as "alimentary anaemia" by ARON (1922) is often associated with scurvy or Barlow's disease; 7 out of 15 of his cases had scurvy signs, but whether the same factor is the cause of both he could not say; it is probable that the condition is due to deficiency of several vitamins and a secondary bacterial infection. The red cells may fall to 2 millions and the white be as high as 31,000.

From all these observations one sees that the old story is repeated. War and destitution increase the incidence of scurvy equally and impartially in adults and infants. The particular symptoms will vary in correspondence with the deficiency of particular vitamins other than C, and the symptom complex will show gradations towards beriberi or towards rickets accordingly. The use of artificial foods and sterilized milks may be potent causes of scurvy, more particularly in children, yet the beneficial action of the heat in destroying pathogenic organisms must be taken into account, and the attendant danger of scurvy must be obviated by the addition of antiscorbutic juices and by hygienic attention.

Experimental Work on Scurvy.—A large amount of research has been carried out, in many countries, but particularly in France, by MOURIQUAND and his collaborators (1920, 1922); in America, by HESS & UNGER (1919, 1921), and by GIVEN & MCCLUGGAGE (1919, 1921 *a* & *b*); and in England, by CHICK (1920), HUME (1921) and SKELTON, and by HARDEN & ZILVA (1920)—to mention only these. Investigation has been concentrated on the following problems:—(*a*) The essential nature and the keeping properties of the antiscorbutic vitamin; (*b*) the comparative value of antiscorbutic foods; (*c*) the prophylactic and curative application of such foods; and (*d*) pathological effects of deficiency, discrimination of inanition from starvation, hypovitaminosis and avitaminosis.

Vitamins, though variously described as catalysers, ferments, complements, etc., have not been isolated chemically. As regards the

antiscorbutic vitamin C it is known to be a non-nitrogenous body (VEDDER (1921)), soluble in water, absolute alcohol, acetone, and commercial ethyl acetate ; it cannot be extracted from partially dried juice by ether, chloroform or carbon tetrachloride ; and, unlike vitamin B, it is not adsorbed by animal charcoal or precipitated by phosphotungstic acid. Its biological properties are better known, from animal experimentation. The agents most destructive to the vitamin are oxidation, alkalies, ordinary heat (though heating in vacuo or in an atmosphere of CO_2 causes little reduction of its efficiency [HESS & UNGER (1919, 1921), ZILVA (1921,1923)]), and keeping. If lemon juice is evaporated in vacuo at room temperature and made up in tablet form it retains its efficiency for guineapigs for a year, and such tablets should be useful in arctic work [BASSETT-SMITH (1921)] ; or if evaporated-down and kept anaerobically (ZILVA). Orange juice desiccated at room temperature was effective for two years [HARDEN and ROBISON (1920)].

The most efficient antiscorbutic foods, with their relative values. are cabbage 110, lemon and orange juice 100, swede juice 60, germinating peas, beans, lentils, 30, carrot, radish, beetroot juice each 7·5, juice of beef 7·5, cow's milk 1·0–1·5—all of these in the fresh state. Some roots, like radish and beet, are almost useless as antiscorbutics. Cabbage juice boiled for ten minutes at 100° C. and boiled potato soups are good ; raw juice of apples, carrots, and grapes less so ; 5 cc. of raw lemon juice is sufficient to prevent scurvy in sucklings. For older children and adults vegetables should not be cooked for more than 30 minutes, and the raw liquor should be used. Raw tomato is very valuable [CHICK & DALYELL (1919)]. 10 cc. of the fresh juice of strawberries was curative to guineapigs [SMITH *et al.* (1921)]. Bananas are greatly inferior to most other fruits and vegetables ; a large quantity (10 to 15 grams) is required to supply sufficient vitamins for a guineapig [LEWIS (1919)].

A very considerable amount of experimental work has been carried out to determine the retention of their antiscorbutic property by dried fruits and vegetables : except in the case of tomatoes, canning destroys the greater part of it (Lister Institute Research). Orange juice dried at 50–60° C. for half to one hour is undoubtedly reduced in value by half, but the Merrell-Soule method is less destructive, and it is believed by GIVENS & MCCLUGGAGE (1919) that this dried juice will serve as a convenient antiscorbutic in infant feeding, polar exploration, etc. MOURIQUAND & MICHEL (1920) believe that the effective properties reside in the fluid of the fresh vegetable cells, which they call " eau vivante " ; but if the cells are dried and water is reabsorbed the efficiency is not regained ; this living vegetable fluid is essential for calcium metabolism ; for the active principles these authors use the term " minimum substances." At Quetta SHORTEN (1921) found that sun dried tomatoes, cabbage and potatoes still retain their antiscorbutic value ; other vegetables were of little or no use.

With regard to dried milks much has been written ; it may be summed up thus : It is recognized that milk-powders may vary in their antiscorbutic properties, according to the initial quantity of the vitamin in the milk (which is influenced by the feeding of the cows) and to the method employed in the drying, the spray process being more destructive to the vitamin than the Just process. This does not invalidate milk-powders as food for infants, but it necessitates their being supplemented by substances containing the requisite vitamin,

the only possible exception being powders prepared by the Just process from summer milk or from cows especially fed [HART, STEENBOCK, & ELLIS (1921)].

For laboratory experiments guineapigs were practically always used, except in a small number made by HARDEN & ZILVA (1920), and also by BARNES & HUME (1921), when monkeys were employed.

Pathological changes found in experimental scurvy.—The blood picture is that of a secondary anaemia with often a leucocytosis due to subsequent bacterial infections; the blood platelets, according to HESS, are not increased. FINDLAY (1921) describes the following changes in the vascular system of guineapigs: (1) degenerative changes in the lining endothelium; (2) extreme congestion; (3) fine oedema of the tissues round the vessels; (4) haemorrhagic areas in close relation to the capillaries, haemorrhages being found as early as the 12th day in the muscles at the back of the knees, and most of the internal organs showing haemorrhagic foci later. There was no fatty degeneration of the heart. The following changes have been noted by McCARRISON (1919 *a* & *b*), BASSETT-SMITH (1920), LA MER, and CAMPBELL (1920) in the adrenal glands:—increase in size and weight, marked diminution of the adrenal content, haemorrhagic infiltration usually circumscribed in extent and in the cortex, degenerative changes in the cellular elements of the cortex and medulla. From this it is concluded that a scorbutic diet causes a profound depreciation of the functions of the glands in guineapigs and that this occurs before the clinical evidences of scurvy manifest themselves. BESSESEN (1923) states that the spinal cord, lungs, kidneys, testicles and hypophyses are also increased in weight, and that the results found in scurvy and starvation are to a certain extent explicable as due to inanition, though there are marked differences in some organs indicating that the scorbutic condition includes factors differing from those found in ordinary inanition.

MOURIQUAND and his co-workers (1921, 1922 *a* and *b*) show how a hypovitaminosis accounts for cases of transient or relapsing scurvy, which are quite different from avitaminosis as found in the inanition of starvation. These views are also held by GODLEWSKI (1921), who says: "Traces of the living substance in the food of infants serve to keep it alive but in an anaemic and pre-scurvy state. For a normal growing condition it is necessary that not only traces but a daily ration of the essential substances must be given, which are probably required for nuclear formation, and for this thyroid extract, fresh vegetables, milk, fruits and meat are useful."

As stated early in this review, the gradation of one deficiency disease into another is so fine that for the proper understanding and treatment of them it is necessary not merely to focus attention upon one kind of vitamin only, but to see that in the dietary provided all shall be adequately represented.

REFERENCES.

ABELS (H.). (1919.) Ueber die Rolle der Infekte beim Skorbut der Kinder und Säuglinge. (Möller-Barlowsche Krankheit.)—*Med. Klinik.* xv. 1084–1086.

——. (1920.) Ueber das Verhalten des skorbutischen Organismus gegen Infekte (skorbutische Dysergie).—*Wien. klin. Woch.* xxxiii. 899–901.

AIKMAN (J.). (1921.) Infantile Scurvy.—*Arch. of Pediatrics.* xxxviii. 41–51.

ARON (H.). (1922.) Alimentäre Anämie und Skorbut.—*Klin. Wosh.* i. 2035–2039.

BASSETT-SMITH (P. W.). (1920 *a.*) Preliminary Report of Experimental Investigation for Prevention of Scurvy in the Royal Navy.—*Jl. Roy. Naval Med. Service.* vi. 117–121.

——. (1920 *b.*) Scurvy: with Special Reference to Prophylaxis in the Royal Navy.—*Lancet.* 1920. May 22. 1102–1105. Also *Proc. Roy. Soc. Med.* (War Section). xiii. 51–69.

——. (1921.) Further Experiments on the Preservation of Lemon Juice and Prevention of Scurvy.—*Lancet.* Aug. 13. 321–322.

BESSESEN (D. H.). (1923.) Changes in Organ Weights of the Guinea Pig during Experimental Scurvy.—*Amer. Jl. Physiol.* lxiii. 245–256.

BIERICH (R.). (1919.) Ueber Skorbut.—*Deut. Arch. f. klin. Med.* cxxx. 151–171.

CHICK (H.) & DALYELL (E. J.). (1919.) Ueber die Gefahr des Skorbuts in Wien.—*Wien. klin. Woch.* xxxii. 1219–1220.

—— & ——. (1920.) The Influence of Overcooking Vegetables in causing Scurvy among Children.—*Brit. Med. Jl.* Oct. 9. pp. 546–548.

COMRIE (J. D.). (1920.) Scurvy in North Russia.—*Edinburgh Med. Jl.* Apr. Vol. 24. No. 4. New Ser. pp. 207–215.

DALYELL (E. J.). (1920.) Von den Gewichtskurven einiger Fälle von Säuglingsskorbut in Wien.—*Wien. Med. Woch.* lxx. 419–420.

DELF (E. Marion). (1921.) Studies in Experimental Scurvy. With Special Reference to the Anti-Scorbutic Properties of some South African Food-Stuffs.—*Publ. of the S. African Inst. for Med. Research.* No. 14. 105 pp.

DONALDSON (S.). (1923.) Some Aspects of Scurvy in the Native, and its Treatment by Orange Juice Intravenously.—*S. African Med. Rec.* xxi. 7–12.

VAN DRIEL (B. M.). (1922.) Bier en Scheurbuik.—*Geneesk. Tijdsch. v. Nederl.-Indië.* lxii. 306–331.

FABER (H. K.). (1921.) Infantile Scurvy following the Use of Raw Certified Milk.—*American Jl. Diseases Children.* xxi. 401–405.

FINDLAY (G. M.). (1921 *a.*) The Effects of an Unbalanced Diet in the Production of Guinea-Pig Scurvy.—*Biochem. Jl.* xv. 355–357.

——. (1921 *b.*) The Blood and Blood-Vessels in Guinea-Pig Scurvy.—*Jl. Path. & Bact.* xxiv. 446–453.

GIORGI (E.). (1921.) Morbo del Barlow epidemico, in rapporto all approvvigionamento del latte in Venezia.—*Pediatria.* xxix. 66–84.

GIVENS (M. H.) & MCCLUGGAGE (H. B.) (1919.) The Antiscorbutic Property of Fruits. 1. An Experimental Study of Dried Orange Juice.—*American Jl. Dis. of Children.* xviii. 30–41.

—— & ——. (1921.) The Effect of Heat and Age upon the Anti-Scorbutic Vitamine in Tomatoes.—*Proc. Soc. Experim. Biol. & Med.* xviii. 164.

——, ——, & VAN HORNE (E. G.). (1921.) The Anti-Scorbutic Property of Raw, Dried, and Cooked Apples and Bananas.—*Ibid.* 140–141.

GODLEWSKI (Henri). (1921.) Carence partielle et préscorbut.—*Presse Méd.* 682–683.

HARDEN (A.) & ROBISON (R.). (1920.) The Anti-Scorbutic Properties of Concentrated Fruit Juices (Part iii).—*Biochem. Jl.* xiv. 171–177.

—— & ZILVA (S. S.). (1920.) The Antiscorbutic Requirements of the Monkey.—*Ibid.* 131–134.

HART (E. B.), STEENBOCK (H.) & ELLIS (N. R.). (1921.) Anti-Scorbutic Potency of Milk Powders.—*Jl. Biol. Chem.* xlvi. 309.

HEHIR (P.). (1919.) Scurvy.—*Indian Jl. Med. Res.* (Special Indian Sci. Congress No.). 79–82.

HESS (A. F.). (1920.) Scurvy in the World War.—*Internat. Jl. Public Health.* i. 302–307.

——. (1921.) Newer Aspects of Some Nutritional Disorders.—*Jl. Amer. Med. Assoc.* lxxvi. 693–700.

—— & UNGER (L. J.). (1919.) The Scurvy of Guinea-Pigs. iii. The Effect of Age, Heat and Reaction on Anti-Scorbutic Foods.—*Jl. Biol. Chem.* xxxvi. 293–302.

—— & ——. (1921.) The Destructive Effect of Oxidation on Anti-Scorbutic Vitamine.—*Proc. Soc. Experim. Biol. & Med.* xviii. 143.

HOPKINS (F. Gowland). (1921.) The Huxley Lecture on Recent Advances in Science in their Relation to Practical Medicine and the Nutritional Requirements of the Body.—*Lancet.* Jan. 1. 1–7.

HUME (E. M.). (1921.) Investigation of the Anti-Scorbutic Value of Full Cream Sweetened Condensed Milk by Experiments with Monkeys.—*Biochem. Jl.* xv. 163–166.

LAMER (V. K.) & CAMPBELL (H. L.). (1920.) Changes in Organ Weight produced by Diets deficient in Anti-Scorbutic Vitamine.—*Proc. Soc. Experim. Biol. & Med.* xviii. 32.

LEWIS (H. B.). (1919.) The Antiscorbutic Value of the Banana.—*Jl. Biol. Chem.* xl. 91–101.
LIND (W. A. T.). (1919.) Some Interesting Details of an Outbreak of Scorbutus. —*Med. Jl. Australia.* Aug. 9. 107–108.
MCCARRISON (R.). (1919 *a.*) The Pathogenesis of Deficiency Disease.—*Indian Jl. Med. Research.* vi. 275–355.
——. (1919 *b.*) The Pathogenesis of Deficiency Diseases. iv. The Influence of a Scorbutic Diet on the Adrenal Glands.—*Ibid.* vii. 188–194.
——. (1919 *c.*) The Effect of a Scorbutic Diet on the Adrenal Glands.—*Brit. Med. Jl.* Aug. 16. 200.
——. (1920.) The Influence of Deficient and Ill-balanced Dietaries in favouring the Development of Gastro-Intestinal Infections.—*Indian Jl. Med. Research* (Special Indian Science Congress No.). 38–43.
MACVICAR (Neil). (1920.) Notes of Scurvy and Allied Conditions.—*S. African Med. Rec.* xviii. 284–287.
MESSERSCHMIDT (Th.). (1919.) Anamnestische Erhebungen bei Skorbut Kranken.—*Med. Klinik.* xv. 764–767.
MOURIQUAND (G.) & MICHEL (P.). (1920.) Desiccation et perte du pouvoir antiscorbutique des végétaux frais.—*C. R. Soc. Biol.* lxxxiii. 865.
—— & ——. (1921.) Les états scorbutiques passagers et récidivants.—*Ibid.* lxxxiv. 734–735.
—— & ——. (1922 *a.*) Sur la valeur antiscorbutique du jus de citron sterilise et sur la question des doses d'antiscorbutique necessaires au metabolisme.—*Ibid.* lxxxvii. 1403–1404.
—— & ——. (1922 *b.*) Adjuvants non antiscorbutiques de la substance anti-scorbutique.—*Ibid.* 1404–1407.
NICOLAU (S.) (1919.) Etude sur une éruption folliculaire et périfolliculaire dans le scorbut. Dermatite papulokératosique scorbutique.—*Ann. Dermat. et Syph.* Ser. 5. vii. 399–434.
PESCHIC (S.). (1923.) Skorbut als infektiöse Krankheit. Die grosse Skorbut-epidemie im Jahre 1917.—*Ztschr. f. klin. Med.* xcvii. 169–181.
PICARD (R.) & LLOYD (G. W.). (1920.) The Early Manifestations of Scurvy.—*Proc. Roy. Soc. Med.* (Sect. Med.). xiii. 43–50.
SHEASBY (H.). (1921.) Swelling of the Pinna—an Early Sign of Deficient Anti-Scorbutic Vitamine.—*Practitioner.* cvi. 215–216.
SHEPPARD (A. L.). (1920.) Notes on Early Scurvy.—*Jl. Roy. Army Med. Corps.* cxxxv. 232–234.
SHORTEN (J. A.). (1921.) The Vitamin Content of Certain Sun-Dried Vegetables. —*Proc. Roy. Soc. Med.* (Sect. Therap. & Pharm.). xiv. 20–21.
SMITH (C. A.), BERGEIM (O.) & HAWK (P. B.). (1921.) The Antiscorbutic Potency of Strawberries.—*Proc. Soc. Experim. Biol. & Med.* xix. 22.
STEVENSON (A. G.). (1920.) Notes on the Etiology of an Outbreak of Scurvy in North Russia, with an Experiment in Test-Dieting.—*Jl. Roy. Army Med. Corps.* xxxv. 218–223.
THURSFIELD (J. H.). (1922.) A Lecture on Rickets, Marasmus and Scurvy.—*Lancet.* Sept. 9. 551–553.
VEDDER (E. B.). (1921) (1922.) The Etiology of Scurvy.—*Milit. Surgeon.* xlix. 133–150, 502–512 ; l., 534–546.
WEILL (E.) & DUFOURT (A.). (1919.) [Deficiency Disease in Children.]—*Arch. Méd. des Enfants.* xxii. 561.
WILLCOX (W. H.). (1920.) The Treatment and Management of Diseases due to Deficiency of Diet, Scurvy and Beriberi.—*Brit. Med. Jl.* Jan. 17. 73–77.
WILTSHIRE (H.). (1919.) Hyperkeratosis of the Hair Follicles in Scurvy.—*Lancet.* Sept. 27. 564–565.
ZILVA (S. S.). (1921.) The Influence of Aeration on the Stability of the Anti-Scorbutic Factor.—*Lancet.* Mar. 5. 478.
——. (1923 *a.*) The Influence of Reaction on the Oxidation of the Antiscorbutic Factor in Lemon Juice.—*Biochem. Jl.* xvii. 410–415.
——. (1923 *b.*) A Note on the Conservation of the Potency of Concentrated Antiscorbutic Preparations.—*Ibid.* 416–417.

MEDICAL ZOOLOGY.

BARROW (John V.). **A Clinical Study of the Intestinal Protozoa, based on Seven Hundred and Twenty-Five Cases.**—*Amer. Jl. Trop. Med.* 1924. Jan. Vol. 4. No. 1. pp. 23–32. [4 refs.]

The aim of this interesting paper is to stimulate the imagination of protozoologists and pathologists; the aim has been present to the author since 1919.

The discovery of yeast-like bodies in the blood of human beings illustrates how easily organisms much bigger than bacteria can get into the circulation from their normal station in the intestine, and the discovery of *Entamoeba histolytica* in a necrotic hip bone in a case of arthritis deformans illustrates a novel conception of intestinal protozoa in pathology; yet neither of these discoveries seems to have sufficiently aroused the attention of protozoologists, much less of pathologists or clinicians. Even if protozoa get from the intestine into the blood and there and then die they may impart toxins and perhaps import bacteria into the circulation.

The author summarizes the results of faecal examination of 725 clinical cases in which some sort of gastric disturbance, or abdominal distress, or failure of appetite, or loss of interest in life was the chief cause of complaint; in 535 *Chilomastix mesnili* was present; in 115 *Entamoeba histolytica*; in 97 trichomonads; in 74 Giardia; in 32 "Craigia"; in 3 Waskia; besides Blastocysts in 261, Spirilla in 180, and fatty acid crystals in 279. He also gives a summary of the cases of arthritis [number not stated] that he has studied. Protozoa was found in the faeces in every case, chiefly Chilomastix (94 per cent.), but also the dysentery amoeba (in 12·5 per cent.), trichomonads (8·3 per cent.), Waskia (6 per cent.), "Craigia" (6 per cent.), Giardia (2·8 per cent.).

When with such prevalence of intestinal protozoa we consider how any dietary indiscretion, or any mechanical defect in the digestive tract, may encourage their growth and enterprise the significance of the two discoveries mentioned at the outset becomes sufficiently arresting.

A. Alcock.

HEGNER (R. W.). **Some Investigations on Entozoic Protozoa.**—Reprinted from *Amer. Naturalist.* 1924. Jan.–Feb. Vol. 58. pp. 5–23.

A most interesting and suggestive lecture (well worth perusal wherever tropical medicine is seriously studied), based on well-established facts, not a few of which have been recently minted in the Johns Hopkins University. For this assemblage of facts the author prefers the term "Medical Zoology" to the term "Parasitology," since many of the animal organisms concerned are not parasites in anything but, perhaps, the universal sense that makes the whole world kin in respect of interdependence. The author also comments on the conventional association of this body of facts with books on tropical diseases, and he agrees with the view that this is essentially a matter of convention, and is not a reflection of any such restrictions in Nature.

A. A.

DE GEDROYC (Michal). **Les protozoaires agents immunisants contre les maladies contagieuses.**—*C.R. Soc. Biol.* 1924. Apr. 4. Vol. 90. No. 12. pp. 907–908.

Arguing that since free-living Protozoa are natural destroyers of bacteria they can be utilized in the field of immunization, the author carried out a series of experiments, briefly summarized in this paper, upon the action of common species of Paramoecium on the virus of rabies, and he gives here the following results of his observations. If a culture of Paramoecium and an emulsion of fixed virus (1 per cent.) are injected under the dura meter of a rabbit rabies subsequently develops; but if the Paramoecia be cultivated with the fixed virus for 24 hours "the microbes of rabies become innocuous" and the culture when injected confers immunity against a subsequent injection of fixed or street virus. Furthermore, a 2 to 4 hours culture of Paramoecium and fixed or street virus injected along with "fresh" Paramoecium possesses protective power against an immediately following injection of virus.

A. A.

KOFOID (Charles Atwood) & SWEZY (Olive). i. **On the Morphology and Behavior of** *Pentatrichomonas ardin delteili* **(Derrieu and Raynaud).**—*Univ. California Public. Zool.* 1923. Aug. 16. Vol. 20. No. 16. pp. 373–390. With 1 plate & 1 fig. [23 refs.]

——& ——. ii. **Pentatrichomoniasis in Man.**—*Amer. Jl. Trop. Med.* 1294. Jan. Vol. 4. No. 1. pp. 33–41. With 1 fig. [7 refs.]

i. This trichomonad is maintained to be different from *Trichomonas hominis*, having constantly five anterior flagella one of which arises along with the axial filament of the undulating membrane from a blepharoplast distinct from that appertaining to the other four. It eats red blood corpuscles in stools and cultures. It has been observed by the authors in three cases of chronic diarrhoea resistant to treatment, two of them from the tropics and the other from a tropical contact. The morphology, fission, locomotion, culture etc., are described in detail.

ii. *Pentatrichomonas ardin delteili*, distinguished from *Trichomonas hominis* by the possession of five flagella, "should be regarded as the aetiological factor in one type of chronic diarrhoea" in man. Its appearance, behaviour in various circumstances, and method of cultivation are here related.

A. A.

PONOSCHINA (V. G.). [**On the Rôle of** *Trichomonas vaginalis* **in Human Pathology.**]—*Russian Jl. Trop. Med.* Moscow. 1923. No. 1. pp. 27–30. With 1 plate. [In Russian.]

The author examined the vaginal discharge of 22 girls from 2 to 14 years of age, and 55 adult women. In the girls the vagina was normal and *Trichomonas vaginalis* absent, whilst amongst the women 29 were suffering from leucorrhoea, sixteen of them showing large numbers of *T. vaginalis*. The author concludes that the parasite is the pathogenic agent of leucorrhoea. Treatment with douches of permanganate of potash and sodium bicarbonate caused the parasites to disappear only temporarily. It was observed that the number of parasites increased considerably after menstruation and after coitus.

C. A. Hoare.

SWEZY (Olive). **The Pseudopodial Method of Feeding by Trichonymphid Flagellates Parasitic in Wood-eating Termites.**—*Univ. California Public. Zool.* 1923. Aug. 16. Vol. 20. No. 17. pp. 391–400. With 14 figs in text. [6 refs.]

The author has observed Trichonympha and Leidyopsis feeding. The food consisted of pieces of dry wood and also of smaller flagellates such as Trichomitus, and it is engulfed, not by the flagella, nor in the flagellar area, but by peculiarly adhesive pseudopodia formed at the posterior end of the body. In observing these termite flagellates alive normal salt solution is inhibitive and destructive; the liquid of the host's intestine is sufficient.

A. A.

PONSELLE (A.). **Culture des trypanosomes pathogènes.**—*C.R. Acad. Sci.* 1924. Mar. 31. Vol. 178. No. 14. pp. 1219–1221. [5 refs.]

In the culture of pathogenic trypanosomes the principal obstruction, in the author's opinion, is the presence of antibodies in the infested blood; these are adsorbed by a peptone-gelatine medium. Osmotic pressure also plays an important part, therefore the culture-medium should be hypertonic in respect of the blood of the infested host. The medium preferred by the author is constituted as follows:—Pure crystallized NaCl from 0·3 to 0·8 per cent. (determined in each case by the optimum osmotic pressure for the given species of trypanosome); peptone de Witte 2 gm.; purest gelatine (Coignet, gold medal) 2 gm.; normal Na_2CO_3 solution 1 cc.; twice distilled water 100 cc. The gelatine and peptone are quickly dissolved at 100°C. in a water-bath, the solution is autoclaved without filtration for half an hour at 110°C., and after cooling at laboratory temperature (at which it is liquid) is mixed with its own volume of rabbit serum for isolation cultures and of defibrinated rabbit blood for subcultures. The mixture is distributed (3 cc. in each tube) and inactivated for half an hour at 56°C. Culture should begin with 1 or 2 drops of heart blood of a mouse killed at about the middle term of an infection. The tubes after shaking are left to incubate peacefully at 23°–26°C. for 15 days; then, or perhaps a little before, numerous white punctiform colonies can be seen with a hand-lens in the wall of the tube, above the red corpuscles.

The cultivated trypanosomes morphologically are exactly like those figured from the gut of tsetse-flies, but are non-virulent for receptive animals. The differences of osmotic pressure to be allowed for in cultivation may perhaps explain the variable susceptibility of tsetse-flies to infection.

A. A.

REICH (W. W.). *Trypanosoma brucei* **as a Filterable Virus. Studies on the Site of Origin of the Filter-Passing Bodies.**—*Jl. Parasit.* 1924. June. Vol. 10. No. 4. pp. 171–181. [4 refs.]

This is a continuation of work first broached in the *Journal of Parasitology* in 1923 (see this *Bulletin*, Vol. 20, p. 335). In the present paper the author describes his methods, and tabulates the results of experiments, which "indicate that *Trypanosoma brucei* undergoes certain changes in morphology in the internal organs of such nature as to permit passage through the pores of bacteria-proof filters. It would seem that such forms reside in greatest numbers in the liver

and spleen of . . . . guineapigs dead of infection. . . . . In a series of seventy-two filtration experiments, using the organs of guineapigs dead of infection with *Trypanosoma brucei*, inoculation of bacteria-free filtrates into normal guineapigs has determined infection in twenty cases. . . . . In a series of seven experiments the filtrates from highly infected blood obtained during the life of the animal did not prove infective for guineapigs."

A. A.

v. FENYVESSY (B.) & REINER (L.). **Untersuchungen ueber den respiratorischen Stoffwechsel der Trypanosomen.**—*Ztschr. f. Hyg. u. Infektionskr.* 1924. Apr. 7. Vol. 102. No. 1/2. pp. 109–119. [10 refs.]

The essential conclusion of this paper is that Trypanosomes like other animals consume O and give off CO_2, and that they can take their O as readily from simple plasma, or even from serum or bouillon, as from blood.

A. A.

CERQUEÍRA (Dionisio). "*Trypanosoma minasensis.*"—*Scienceia Medica.* 1924. Mar. 31. Vol. 2. No. 3. p. 155.

In December 1923 the author, on examining the blood of a small monkey, *Callitrix pencillata*, found a very motile trypanosome which seemed to be morphologically identical with *T. minasense*, and this diagnosis was confirmed by CHAGAS, who first discovered it in 1909. Six guineapigs were inoculated with the blood (0·5–2 cc.), containing trypanosomes, but infection was not produced.

H. Harold Scott.

ARCHIBALD (R. G.) & SUSU (B.). **A Sporozoon from the Spleen of a Case of Splenomegaly in the Sudan.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Feb. 21. Vol. 17. No. 8. pp. 482–484. With 2 plates (1 coloured).

The patient that furnished the specimens of the sporozoon here described and beautifully figured was an anaemic cachetic middle-aged Arab with an enlarged liver, a much enlarged spleen, and a history of irregular fever and increasing debility. Kala azar being suspected, the spleen was punctured, and in smears of the spleen-matter there were found (extra-cellular) groups and clumps of crescentic non-pigmentiferous bodies, 9–10 by 3–3·5 microns in their dimensions, having one end more pointed than the other and a loosely-granulous excentric nucleus. No other organisms were found in the spleen smears and nothing was found in the blood; but a blood-film gave evidence of blood destruction, with normoblasts, megaloblasts, and polychromatophilia, and the several percentages of leucocytes in a differential count of 500 were, polynuclears 31, large mononuclears and transitional 17·8, large lymphocytes 19·8, eosinophiles 7·2, and basophiles 0·8. The enigmatic bodies were not found in bloody material from a second spleen-puncture made a fortnight afterwards, nor in peripheral blood examined at the same time, and the observations were inconclusively terminated by the unceremonious departure of the patient.

The nature of the bodies is discussed on the reasonable assumption—justified by the admirable precautions taken throughout against contamination—that they actually came from the spleen. The large

nucleus and the lack of a cell wall are held to disprove a vegetable nature. They are thought not to be spores of sarcosporidia, from their site and from the absence of the clear hyaline end. Something may be said both for and against an alternative verdict in favour of haemogregarine or coccidium, in schizogony. It seems safe at least to refer them to the Sporozoa.

A. A.

BENDER (Lauretta). **Kurloff Bodies in the Blood of Guinea Pigs.**—*Jl. Med. Res.* 1924. June. Vol. 44. No. 4. (No. 193.) pp. 383–399. With 2 plates and 2 charts. [21 refs.]

When studying the blood of normal guineapigs a progressive eosinophilia was observed to be coincident with the appearance of Kurloff bodies, a novel phenomenon that led the author to an investigation of the work already done to determine the nature and origin of these inclusions. ROSS's theory that they are stages in the life of a spirochaete was not confirmed. ROSS's evidence was for the most part based on vital staining with UNNA's polychrome methylene blue; this stain in the author's use was found often to contain a number of short spirochaete bodies having 2 or 3 twists; no spirochaetes could be found by her in guineapig blood or tissues by dark-field illumination. WOODCOCK's theory that the Kurloff bodies are phagocyted and imperfectly digested red-blood corpuscles was not confirmed—nor could his evidence of the presence of iron in these inclusions be verified; in fact, to all the stains used by the author—and particularly to the new methylene blue G G stain—the reactions of the erythrocyte and the Kurloff body were so different as to discountenance the theory that the two are inter-related. Cells containing a Kurloff body sometimes contain also small round "accessory" bodies about the size of a platelet; these, which have not previously been noticed, may sometimes be demonstrated by Durand's vital stain, but by other staining methods they are disclosed only as unstained points. For the rest, the paper is largely an account of the new methylene G G vital stain, which the author regards as particularly valuable for the study of Kurloff bodies.

A. A.

i. MANIFOLD (J. A.). **Report on a Case of Sarcosporidiosis in a Human Heart.**—*Jl. Roy. Army Med. Corps.* 1924. Apr. Vol. 42. No. 4. pp. 275–279. With 4 text figs. [7 refs.]

ii. YAKIMOFF (W. L.). *Bodo porteri* **n. sp.**—*Ann. Soc. Belge de Med. Trop.* Brussels. 1924. Jan. Vol. 3. No. 3. pp. 305–306. With 1 fig.

iii. MAZZA (Salvador). **On the Duration of Relative Immunity in Malaria of Birds.**—*Jl. Trop. Med. & Hyg.* 1924. May 1. Vol. 27. No. 9. pp. 98–99.

i. Five cysts, of microscopic size, in the muscle of a heart in the pathological laboratory of the R.A.M.C.

ii. Cultivated from the intestinal contents of a mouse.

iii. Already noticed (*ante* p. 425).

A. A.

BARBER (M. A.). **The Effect of** *Chara robbinsii* **on Mosquito Larvae.**—*Public Health Rep.* 1924. Mar. 28. Vol. 39. No. 13. pp. 611–615. [14 refs.]

The author summarizes, with full references, the published observations, some of them made under artificial but most of them under natural conditions, of most of the writers on Chara and its relations to

mosquito larvae. Some (CABALLERO and PARDO in Spain) have definitely pronounced the relation in the case of certain species of these to be hurtful; others (METZ, SMITH, RUCKER in America, and GALAMINI in Italy) have almost as definitely concluded it to be not hurtful; others (ALLUAUD in Morocco, BUXTON in Palestine, HACKER in Malaya, VASCONCELOS in Mexico) have been not decidedly against, but not conclusively in favour of a deleterious influence exercised by their local species of Chara. The author here records his own very careful observations in Louisiana of the relations of *Chara robbinsii* to the larvae of the local species of Anopheles, of *Aëdes aegypti* (*Stegomyia fasciata*), and of *Culex quinquefasciatus*; from these observations made both in nature and in the laboratory he makes the commendably cautious generalization that "whatever larvicidal power may be possessed by some species of Chara, this property is not common to the whole genus," and the equally judicious recommendation that "in any test of the possible larvicidal effect of Chara, or of any other plant, the food requirements of the larvae should be taken into consideration."

The author observed larvae of all sizes and pupae of Anopheles to be plentiful in rice-fields and stagnant ditches containing *Chara robbinsii* and extremely so where it formed protective mats just above the surface of the water; in such mats 4 to 5 larvae could be taken at a dip.

In the laboratory, larvae did not grow well and frequently died out in aquaria containing merely green fresh Chara; but in aquaria well supplied with food—even if the food were fine-ground fresh or dry Chara, or rotting Chara—they throve equally well whether fresh growing Chara were present or not. Chara alone, unless partly rotting, is a poor source of food for the larvae; but the mixture of living and rotting Chara is so good that the author is accustomed to use it for rearing mosquito larvae.

A. A.

WILLIAMSON (K. B.). **The Use of Gases and Vapours for killing Mosquitoes breeding in Wells.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Feb. 21. Vol. 17. No. 8. pp. 485–519. With 4 figs. [29 refs.]

The greater part of this paper deals with the results of experiments in the laboratory, but a few tests were made in shafts and wells in the open.

Paraformal (3 oz. per sq. yard) vaporized at the bottom of a 3-ft. open shaft killed larvae of *Anopheles maculipennis* in 32 minutes, and SO_2 ($2\frac{1}{2}$ lb. S per 1,000 c. ft.) killed them in closed wells in 3 to 4 hours. SO_2 may act in part indirectly by acidifying the water; but the sulphur method is tedious and expensive. Chloropicrine evaporated in an open well $3\frac{1}{2}$ ft. deep killed all larvae of *A. maculipennis* and *Culex pipiens* within 3 days. The vapour of white flake-naphthaline killed larvae of *Ochlerotatus punctor* within 4 hours, and an old sample of crude naphthaline had the same effect over night. Chlorine generated from HCl and bleaching powder is too expensive and too difficult for manipulation in a well for practical use. It is worth noting that a jet of steam thrown upon the surface of the water (in a pie-dish) containing larvae of *A. maculipennis* killed about half of them, although the heat communicated to the water was negligible. Successful laboratory experiments with CS_2 and H_2S are also recorded. In laboratory experiments with chloropicrine eggs of *A. maculipennis* were much more resistant than larvae.

In using gases wells should be closed, and the author gives an illustration of a portable parachute to be lowered into the well in order to cut off a small closed space above the water. He gives also figures of apparatus for generating gas at water level and of a floating evaporator, and a list of cheap volatile poisons known to be toxic to mosquitoes.

A. A.

GUBIN (V. M.). [**On the Oiling of Mosquito-Breeding Waters.**]—*Russian Jl. Trop. Med.* Moscow. 1924. No. 2. pp. 53–57. [7 refs.] [In Russian.]

Oiling is almost the only method employed in Russia for the destruction of mosquito larvae; its chief defect is the comparatively rapid disappearance of the petroleum film, which may be due either to evaporation or oxidation or to assimilation of hydrocarbons by bacteria.

The author regards the first two causes as insufficient and therefore directed his attention to the third cause. To a sterilized medium consisting of distilled water 1000·0, magnesium-ammonium phosphate 1·0, potassium phosphate 0·5, and calcium sulphate 0·1, a few drops of hydrocarbons (kerosene, benzene, petroleum) and some slime and water of Moscow ponds were added. The cultures were kept at 35° C. and in nearly all a bacterial film developed and was accompanied by a gradual disappearance of hydrocarbons from the medium. To protect the petroleum film from bacteria the author suggests adding bactericidal substances, such as naphthene acids.

C. A. Hoare.

WEED (A. C.). [**Another Factor in Mosquito Control.**]—*Ecology.* Brooklyn, N.Y. 1924. Jan. Vol. 5. No. 1. pp. 110–111. [Summarized in *Rev. Applied Entom.* 1924. Apr. Vol. 12. Ser. B. Pt. 4. p. 55.]

A thick surface growth of water-hyacinth has been observed by this authority to have the peculiarity of immediately entailing the destruction of mosquito larvae in the affected water. The probable explanation is that the water-hyacinth harbours multitudes of *Entomostraca*, probably a Ceriodaphnia.

HACKER (H. P.). **Malaria Bureau Annual Report, 1922.**—*Federated Malay States Report for the Year 1922.* pp. 16–22.

Observations have been carried on systematically to ascertain whether the local Anopheles have any particular breeding-season or any seasonal prevalence; but no definite conclusions have yet been reached, although certain species do appear to breed throughout the year. Observations of various breeding-places appear to give further support to the view that it is the water itself that tells on the species. Observations of the influence of Characeae give the conflicting results now becoming common: Anopheles larvae were found in ponds where two species of these algae were growing, and lived well in their presence in the laboratory; moreover, the film that formed on the water, to which CABALLERO attributes larvicidal properties, was found to consist mainly of bacteria and infusoria and to be very attractive food for the larvae; subsequently a third species of Characeae was discovered that "certainly seems to act as a deterrent to mosquito breeding." The

interesting observation that the larvae of *A. lindesayi* and *A. wellingtonianus* cannot be distinguished one from the other is recorded.

A. A.

KLIGLER (I. J.). **Notes on the Hibernation of Anopheles Mosquitos in Palestine.**—*Bull. Entom. Res.* 1924. May. Vol. 14. Pt. 4. pp. 403–407. [2 refs.]

As a result of systematic searching for eggs and larvae and adults during the winter months, supplemented by observation of eggs and larvae in the laboratory, the author concludes that the common malaria-carrying mosquitoes of Palestine can survive through part or all of the winter in all their stages.

A. A.

FISHER (H. C.). **Report of the Health Department of the Panama Canal for the Calendar year 1922.**—120 pp. With 7 plates. 1923. Panama Canal Press. Mount Hope, C.Z.

Statements worthy of note in this report are (1) that a lake covered with a dense mat of *Chara fibrosa* and other waterweeds was found to be a fertile breeding-ground of *Anopheles albimanus*; and (2) that invasions of *Anopheles albimanus*, *tarsimaculatus*, and other species may be expected from breeding-places distant two miles or more.

A. A.

TER POORTEN (F. H.). **Some Remarks on *M. indica* and on the Fight against this Mosquito.**—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1924. Pt. 1. pp. 99–114. With 7 plates. [9 refs.]

A variety of *Anopheles indica* characterized by darker pigmentation of the wing and diminished susceptibility to malarial infection is here described. According to the author, *A. indica* makes the vicinity of man the first consideration in its choice of a breeding-place, irrespective of the nature of the water, whether brackish or fresh, clean or foul; hence control of this species must include treatment of all kinds of water in a littoral tract. *A. indica* can travel distances of 1½ to 2 kilometres in quest of blood.

A. A.

NIKOLSKI (V. V.). **Observations on the Biology of the Malaria Mosquito, *Anopheles maculipennis* Mg.**—*Russian Jl. Trop. Med.* Moscow. 1924. No. 2. pp. 41–48. [8 refs.] [In Russian.]

A general account is given of the biology of *A. maculipennis* based on observations conducted throughout the year 1923 near Moscow.

The following are the only species of Anopheles recorded from Russia up to the present:—(1) *A. maculipennis* Mg. (2) *A. bifurcatus*. (3) *A. superpictus* Grassi. (4) *A. sinensis* Wiegel (*pseudopictus* Grassi). (5) *A. pulcherrimus* Theobald (Cellia).

All five occur only in Turkestan; in the Caucasus *A. pulcherrimus* is absent; in European Russia *A. superpictus* is absent as well; whilst only *A. maculipennis* and *A. bifurcatus* are found near Moscow and Petrograd.

C. A. Hoare.

EDWARDS (F. W.). **A Synopsis of the Adult Mosquitos of the Australasian Region.**—*Bull. Entom. Res.* 1924. May. Vol. 14. Pt. 4. pp. 351–401.

In this synoptic revision of the mosquitoes of the Australasian Region the author has applied the same characters for taxonomic purposes as in his revision of the mosquitoes of the Palaearctic Region (*Bull. Ent. Res.* 1921, Vol., 12, p. 263) and of the Oriental Region (*Ind. Jl. Med. Res.* 1922, Vol. 10, pp. 249 and 430).

A. A.

WRIGHT (W. Rees). **On the Function of the Oesophageal Diverticula in the Adult Female Mosquito.**—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 77–82. [5 refs.]

Of 42 mosquitoes (*Anopheles maculipennis* and a few *Theobaldia annulata*) fed, 18 on malt, 23 on sugar, and 1 on orange juice, and all killed immediately afterwards, blood was found in the gut of all of the first 18 and traces of it in the oesophageal diverticula of 5 of these; whereas no food was found in the gut of any and much food was found in the diverticula of all of the last 24 (23 + 1).

A. A.

GRASSI (B.). **Sull' *Anopheles elutus*.**—*Rend. R. Accad. Naz. Lincei.* Rome. Classe Sci. fisiche, matemat. e naturali. 1924. Mar. 16. Vol. 33. No. 6. pp. 207–209. With 2 figs.

One of the final characters used by EDWARDS for distinguishing *A. elutus* (from *A. maculipennis*) is the absence of floats from its egg; but of three specimens obtained by the author from Palestine one laid eggs without floats and two laid eggs with floats, and corroborative observations were made in Palestine. The author has also found female Anopheles in Italy that laid eggs without floats. He regards the distinction between *A. elutus* and *A. maculipennis* as doubtful.

A. A.

BRADLEY (G. H.). **The Natural Breeding Places of Anopheles Mosquitoes in the Vicinity of Mound, Louisiana.**—*Amer. Jl. Trop. Med.* 1924. Mar. Vol. 4. No. 2. pp. 199–223. With 9 figs. [1 ref.]

The natural breeding-grounds of Anopheles in Louisiana are lakes, "bayous" or sluggish moribund channels of deltas, and "sloughs" or dead "bayous" that have become stagnant by obstruction. Clearing these waters of weed diminishes breeding but does not stop it altogether, unless the clearing be well done and be maintained.

A. A.

KONOKHOV. [**New Biological Peculiarities of *Anopheles*.**]—*Russian Jl. Trop. Med.* 1924. No. 2. pp. 48–49. [Summarized in *Rev. Applied Entom.* 1924. May. Vol. 12. Ser. B. Pt. 5. p. 77.]

The story told and stated to be confirmed by experiment in this paper, is that Anopheles observed to be hovering over mattresses spread for disinfection in the sun were found to be attacking bedbugs and body-lice, paralysing these insects by a stab near the head and then by a second thrust sucking the contents of the victims' viscera. Anopheles that had glutted in this way were found to contain malaria parasites supposed to have come through the bugs and lice.

A. A.

MacGregor (Malcolm E.). **A Note on the Fertilisation of Anopheles.**—*Bull. Entom. Res.* 1924. May. Vol. 14. Pt. 4. p. 413.

[Major Harold (see this *Bulletin, ante* p. 142) was able to get *Anopheles maculipennis* to pair readily in cages at Aldershot.] The present author found no difficulty in getting all the four local species of Anopheles to pair in cages in Mauritius.

A. A.

i. Howard (L. O.). **On Zoophilism with Anopheles a Review.** *Jl. Parasit.* 1924. June. Vol. 10. No. 4. pp. 191–198. [22 refs.]
ii. Fritzborn (Stanley B.). **The Terminal Abdominal Structures of Male Mosquitoes.**—*Amer. Jl. Hyg.* 1924. May. Vol. 4. No. 3. pp. 188–212. With 18 figs. [21 refs.]
iii. Sacquépée (E. E. J.). **Le rôle des insectes piquers en France et dans le Nord-Africain. – La désinsectisation.**—*Arch. Méd. & Pharm. Milit.* 1923. Nov. Vol. 79. No. 5. pp. 647–699.

i. This is a good review of the subject, with a comprehensive list of references.
ii. A clearly expressed and generalized account of the subject.
iii. An excellent introduction to the principles of medical entomology.

A. A.

Hertig (Marshall) & Wolbach (S. Burt). **Studies on Rickettsia-like Micro-Organisms in Insects.** -*Jl. Med. Res.* 1924. Mar. Vol. 44. No. 3. (Whole No. 192.) pp. 329–374. With 4 plates. [41 refs.]

This paper includes, besides the authors' own observations on Rickettsia bodies found in various species of insects and besides their own ideas of the nature and bionomic and pathogenetic significance of these bodies, a most useful tabular summary of the known Rickettsiae and their respective hosts, and a bibliography of the group.

The authors have no hesitation in recognizing the Rickettsiae as micro-organisms, having as distinctive characters a bacterium-like form, minute size, slight affinity for aniline stains, and an occurrence in clumps or dense masses within or upon cells. They can be distinguished from lightly-stained Giemsa artifacts, which are evenly scattered, and from the scattered granules normally occurring in smears of insect tissues, which are uniformly spherical, larger, and fewer.

The relation of the Rickettsia-bodies to their respective arthropod hosts varies in constancy and intimacy, from more or less harmless parasitism (" though the typhus organism is more or less pathogenic to the louse ") to a constant and definite symbiosis. Some, such as the Rickettsia of the bedbug, are invariably present in all the individuals of the specific host and are transmitted from the host to its offspring, and in these respects they resemble the yeast-like and bacterium like symbiotes of many insects. Others, such as the Rickettsia of *Culex pipiens*, though transmitted from parent to offspring, are not constantly present in all individuals of the specific host ; this only approximates to symbiosis.

The nature of the Rickettsia-bodies has always been in dispute. They have been regarded variously as normal cell-inclusions, Chlamydozoa, bacteria, mitochondria, and cell-debris. Some of the bodies identified as Rickettsia may be bacteria, and, indeed, there are " several groups of bacterium-like organisms found in insect tissues, some of which may be related to the Rickettsiae," being also symbiotes and

transmitted hereditarily. But the authors have very little patience with Woodcock's theory that Rickettsia-bodies are the dust and ashes of haematophagy and haematoboly.

Though the authors would prefer that the generic term "Rickettsia" should be restricted to intracellular polymorphic forms of admitted pathogenetic significance (? for man), they are content for the present to classify Rickettsiae, for purposes of further study, in three groups, namely, (1) intracellular forms exhibiting coccoid, rod and filamentous phases, *e.g.*, *Rickettsia prowazeki*, *Dermacentroxenus rickettsi*, and the Rickettsiae of the bedbug and *Culex pipiens*; (2) intracellular, uniform coccoid and diplococcoid forms, *e.g.*, of Culicoides and the book-louse Dorypteryx; and (3) forms in which the dominant phase is extracellular in the lumen of the host's gut, *e.g.*, *Rickettsia pediculi*, *R. melophagi*, and the Rickettsiae of the book-louse (Psocus) and of various Mallophaga.

A. A.

McIndoo (N. E.) & Sievers (A. F.). **Plants tested for or reported to possess Insecticidal Properties.**—*U.S. Dept. Agric. Dept. Bull.* No. 1201. Washington. 1924. Mar. 19. 61 pp. [95 refs.]

This catalogue includes 260 species of plants possessing, or supposed to possess, insecticidal properties of some sort or degree. It is obviously impossible to make an abstract of a catalogue: it must be sufficient to state the author's conclusion that only about 5 per cent. of them furnish material for efficient insecticides, and of these only half are to be regarded as "satisfactorily efficient," namely, the three species of Chrysanthemum (*cinerariaefolium*, *coccineum*, and *marschalli*) used for making pyrethrum insect powder, two species of Derris (*elliptica* and *uliginosa*), and a Peruvian root known locally as *cubé* and *barbasco*. The author's opinion of the others is that most of them are not worth consideration, though some of them, when properly prepared and used, are efficient against certain species of insects. The catalogue is full of curious and suggestive information and is well worth having.

A. A.

i. Sullivan (K. C.). **The Use of Calcium Cyanide for the Control of Fleas and other Insects.**—*Jl. Econom. Entom.* 1924. Apr. Vol. 17. No. 2. pp. 230–238.

ii. Wade (Otis). **The Effectiveness of Calcium Cyanide in the Extermination of the Black Tail Prairie Dog,** *Cynomys ludovicianus* **(Ord.).**—*Ibid.* pp. 339–342.

i. Calcium cyanide, which gives off hydrocyanic acid gas on contact with moisture in air or soil, is obtainable in flakes and in granules and powder, which are simply scattered about the field of action.

For fleas, "calcium cyanide used at the rate of eight ounces to 100 sq. ft. can be depended upon to give practically a 100 per cent. kill. In a building which can be closed, four ounces to 100 sq. ft. will give the same results."

ii. Calcium cyanide has also been used with great success to extirpate the large ground squirrels known as prairie dogs, 1 to 2 ounces of flakes being simply thrown into each burrow to a distance of 1 or 2 feet from its mouth without further toil. The best results were obtained in damp weather.

A. A.

KING (H. H.). **[The Use of Sand-Fly Repellants.]** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Feb. 21. Vol. 17. No. 8. p. 530.

The repellant, recommended by LISTON and endorsed by the author, is a solution of 2 drachms of menthol in an ounce of spirits of turpentine; it is applied rather to the clothing than to the skin and it remains potent for 2 or 3 hours.

A. A.

GLASER (R. W.). **The Relation of Microörganisms to the Development and Longevity of Flies.**—*Amer. Jl. Trop. Med.* 1924. Jan. Vol. 4. No. 1. pp. 85–107. With 3 figs. [19 refs.]

After briefly reviewing a part of the history of the vast question of the influence—whether ancillary or prejudicial—of the ordinary intestinal bacteria upon the life-processes of their host, the author describes fully his own experimental observations of the matter. In his experiments he used larvae of Drosophila and adults of it and Musca and Stomoxys and Lyperosia. The summary of his conclusions is as follows:—

"1. The growing or larval stages of flies are dependent upon certain accessory growth factors which must be ingested with the food.

"2. These accessory growth factors are obtained by the larvae from bacteria or yeasts, as well as from higher plant and animal tissues.

"3. When rearing flies on media sterilized at high temperatures, the necessary growth factors for the larvae are destroyed, but can be replaced by contaminating the media with living bacteria or yeasts, by adding large quantities of dead bacteria or yeasts killed at low heat, or by adding fresh sterile animal tissue extracts or fresh sterile plant juices.

"4. Non-pathogenic bacteria, when ingested by adult flies, shorten their life span and reduce the number of ovipositions.

"5. Microörganisms and their activities are not absolutely essential to the normal growth, development, and longevity of the flies investigated.

"6. Microörganisms are present in wild flies, especially in the larvae, because owing to their habits the ingestion of bacteria, yeasts, fungi, etc., cannot be avoided.

"7. Microörganisms may be one of the principal sources for the accessory growth factors of some larval flies found breeding in certain types of media in a state of nature, but this assumption must not be regarded as a proved fact."

A. A.

YORKE (Warrington) & MACFIE (J. W. S.)). **The Action of the Salivary Secretion of Mosquitoes and of *Glossina tachinoides* on Human Blood.**—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 103–108. [1 ref.]

"1. An emulsion of the salivary glands of *A. maculipennis* powerfully agglutinates the erythrocytes of human blood and, less strongly, those of the donkey, rabbit and dog; it has no agglutinating action on the red corpuscles of the mouse, guinea-pig or *Cercopithecus* sp.. Emulsions of the stomach and of the ventral oesophageal diverticulum exerted no agglutinating action.

"2. The haemagglutinin is thermolabile, being destroyed by heating to 60°C. for two minutes or to 50°C. for thirty minutes, and the agglutinated red cell masses dissociate completely under these conditions.

"3. Similar salivary gland emulsions of *Culex pipiens*, *Theobaldia annulata*, *Stegomyia fasciata* and *Glossina tachinoides* do not agglutinate

human red cells, nor does the salivary gland emulsion of *Stegomyia fasciata* agglutinate the red cells of any of the animals mentioned above.

"4. No haemolysin was detected in the salivary gland emulsion of any of these insects.

5. The salivary gland emulsion of *Stegomyia fasciata* exerted no anticoagulating action on human blood, whilst in the case of *A. maculipennis* and of *Glossina tachinoides*, the anticoagulating action was quite definite.

"6. The blood in the stomach of *A. maculipennis* two hours after feeding on a human being was found to exhibit complete agglutination of the erythrocytes, but to be unclotted, whilst that in the stomach of *S. fasciata*, a similar period after feeding on man, exhibited no agglutination, but was coagulated.

"7. This indicates that the salivary secretion is in part withdrawn into the stomach with the blood when the mosquito feeds; further evidence in support of this is the fact that sporozoites were found intermingled with the blood in the stomach and ventral oesophageal diverticulum of infected *A. maculipennis* examined shortly after feeding."

A. A.

BLACKLOCK (D. B.) **Preliminary Report on the Prevalence of the Tsetse-Fly.**—*Sierra Leone Annual Med. & Sanitary Report for the Year* 1922. (Appendix 8.) pp. 68–74.

The observations here recorded were made at the height of the rainy season (July-August) on the Cape Lighthouse Peninsula, the highest temperature recorded during the 39 days' term of observation being 82° F. and the lowest 69° F. *Glossina palpalis* was fairly numerous and was active. Although it was found in considerable numbers in mangrove swamps it did not breed there. It breeds on ground shaded by undergrowth or beneath the shade of oil-palms that have not been stripped of their lower petioles; and such ground may be quite independent of fresh water and at least a quarter of a mile distant from sea. Of 471 wild flies dissected over 5 per cent. were infected with trypanosomes; the infection was located in the proboscis in every instance but one, and in this one instance it was situated in the salivary glands.

A. A.

CURSON (H. H.). **Notes on** *Glossina pallidipes* **in Zululand.**—*Bull. Entom. Res.* 1924. May. Vol. 14. Pt. 4. pp. 445–453. With 4 plates. [1 ref.]

These interesting observations of *Glossina pallidipes* relate to Zululand, where the fly exists chiefly in "bush veld," which, though it spreads over hundreds of square miles, is not found above about 1,500 feet. In summer, when the waters are out, the fly ranges far and wide in this veld; but in winter, when the waters are confined and the bush (being deciduous) is bare, it shelters in jungly thickets along streams; thus it can hardly be said to be restricted to definite "fly-belts." It dislikes wind and rain, does not avoid human dwellings, and seldom or never follows animals into open country far from bush. Its favourite feeding time is late afternoon—even in winter when daylight fails—though it also may be considerably active in the early morning and forenoon. Whatever may be the case elsewhere and with other species, the progress of European order does not in Zululand tend to displace *G. pallidipes*. Before European order game disappears, but much cattle is introduced; large tracts of open veld are ploughed,

but the jungly riparian stretches (which under native conditions are cleared for cultivation) are left untouched; veld fires are controlled and the grazing cattle avoid the seedlings of Acacia and Calastrus bush [which, we assume, the wild herds would have browsed down]; fences also are put up, which protect trees. Thus the ultimate result of European settlement in the case of Zululand is to comfort *G. pallidipes* in the essential item of shade.

A. A.

FULLER (Claude). **Tsetse in the Transvaal and Surrounding Territories; an Historical Review.**—*Union of S. Africa. Department of Agricuture. Entomology Memoirs.* Memoir No. 1. 1923. 68 pp. With 10 maps & 14 figs.

This interesting and perspicacious report should be read in its entirety. Examining the records relating to the occurrence of tsetsefly in territory now for the most part included in the Transvaal, and beginning with the account (which he regards as probably the first to have been published on the subject) given, in 1836, by a certain David HUME, of the damage done by tsetse during a journey along the Limpopo, the author traces the disappearance of the fly throughout an extensive tract of country south of that river and west of the Drakensberg in times anterior to the great outbreak of rinderpest. Even in 1871 "Theunis de Klerk told Baines that 'he thought that the fly was a curse that was being removed from the country,'" and in 1878 FYNNEY wrote that "many parts which six years ago were known as fly country are now entirely free." The two outstanding features of the historical retrospect emphasized by the author are (1) that while the fly continued abundant in the low-lying country east of the Drakensberg down to the outbreak of rinderpest in 1896, it had disappeared before that time, without the intervention of any cataclysm, in the northern and western Transvaal; and (2) the existence of evidence, when the fly still flourished in the western Transvaal, of its association with a particular kind of cover known as "bosrande."

The conclusions and inferences of his historical retrospect are summarized by the author as follows:—

"(I). A practical interest cannot fail to attach to a full examination of the causes which led to a gradual disappearance of tsetse from the Transvaal and the surrounding territory, because:—

(*a*) the disappearance of the insect accompanied the extinction or driving away of certain large wild animals;

(*b*) the disappearance took place throughout many large areas in the absence of any general settlement by Europeans;

(*c*) in the greater part of the infested territory the disappearance did not coincide with any abnormal climatic condition;

(*d*) the disappearance also took place in the presence of many possible sources of food supply, as presented by a variety of wild animals, including antelopes, wildbeeste, zebra, and, in settled areas, by domestic stock.

"(II). Tsetse existed in the north-west Transvaal by virtue of peculiar and localized floral-faunal associations. Thus the fly seems to have been strikingly dependent upon peculiar and circumscribed plant assemblies for a favourable habitat, and to have found an appropriate food supply in the blood of certain wild animals regularly frequenting its haunts.

"(III). As these plant-assemblies or woodings remain and have always harboured, to a greater or lesser extent, a variety of wild animals, it seems

as if some inter-relationship existed between the tsetse and its animal hosts. On the floral-faunal combination the permanency of the insect depended, and this permanency was either governed by the regularity of habit on the part of the hosts or the suitableness of their blood to the successful and continuous propagation of the insect.

"(IV). The disappearance of tsetse from the eastern low country of the Transvaal and the adjoining Portuguese territory (Gazaland, Inhambane, and Lourenco Marques) followed suddenly upon rinderpest in the absence of any regular or recognised system of game preservation.

"(V). It may be assumed that the extinction of fly in both the Transvaal and in the part of Portuguese East Africa under reference was due to the sudden and universal application of a process, leading to extinction, which had been working gradually over many years in the west and north of the Transvaal.

"(VI). It is extremely probable that *Glossina pallidipes* occupied parts of the Districts of Gazaland, Inhambane, and Lourenco Marques.

"(VII). As *Glossina pallidipes* and *Glossina morsitans* both survived rinderpest north of the Zambesi, and as *Glossina pallidipes* survived south of the Maputa, it may be reasonably assumed :—

(*a*) that *Glossina pallidipes* formerly inhabited parts of the intervening 700 miles of territory, and was not always so isolated as it is to-day in Zululand ;

(*b*) that *Glossina pallidipes* was eliminated from the intervening territory by the same process that led to the ultimate disappearance of *Glossina morsitans* from adjacent Transvaal areas.

"(VIII). The process leading to the disappearance of *Glossina morsitans* from the eastern Transvaal at the time of the rinderpest tended to eradicate *Glossina pallidipes* in Zululand, but failed probably because the plant assemblies of Zululand, affording this tsetse a favourable environment, were relatively vast, and successfully harboured a greater food supply. This is explained by these plant assemblies being game sanctuaries in a gunless land, wherein a sustained effort at game preservation had been maintained by the Imperial Government during the period 1887 to 1897.

"(IX). It may be assumed for *Glossina morsitans* that this species, at least, is not able to accommodate itself to changes of environment following the settlement of fly-country by a population possessing fire-arms and given to hunting regularly.

"(X). The complete eradication of the wild fauna does not appear to be essential to tsetse suppression, but a decided reduction thereof—followed up by a constant disturbance of the animals which escape, and to such an extent as to bring about changes of habit and shyness—tends to lead to the disappearance of the insect."

A. A.

GIBSON (A.). **[Report of the Dominion Entomologist for the Two Years 1919 and 1920.]**—*Canada Dept. Agr. Dominion Ent. Rpt.* 1919–1920. 40 pp. With 5 figs. [Summarized in *Experim. Station Rec.* 1924. Apr. Vol. 50. No. 5. p. 454.]

The summary gives the results of a number of academic observations on the effect of experimental diets on the longevity and reproduction of the housefly, stable-fly (Stomoxys), and horn-fly (Lyperosia). A bibliography of 26 titles is included.

A. A.

STYLE (F. W.). **The Larva of the Warble-Fly as a Human Parasite.**—*Brit. Med. Jl.* 1924. June 21. pp. 1086–1087. [5 refs.]

This is a good illustrative case. The patient was a farmer's child in Devon. In November and December the little patient lost flesh

and appetite, and during the following January he had recurrent urticaria of the neck. At intervals during February painless swellings arose in different parts of the face and subsided in the course of a few days or hours, and sudden head pains and headaches occurred sometimes along with vomiting but there was no fever. Early in March there occurred a varicella-like rash on the abdomen. About the middle of March, along with transitory swellings of the face, three definitely circumscribed swellings appeared in different parts of the scalp and from each of these within the next fortnight a maggot emerged. These were identified by AUSTEN as penultimate-stage larvae of *Hypoderma lineatum*.

A. A.

LEGER (André) & COUPUT (André). **Nasomyiase à** *Chrysomyia dux*, **Esch.**—*Bull. Soc. Path. Exot.* 1924. May 14. Vol. 17. No. 5. pp. 375–376.

The patient, a youth of 16, came to hospital at Hué, Annam, for repeated attacks of epistaxis along with nasal obstruction and very severe pain in the nose. In the intervals of epistaxis there was discharge of a malodorous serosanguinolent fluid. On examination the after part of the palate was found to be gangrenous and perforated, permitting the extraction of 5 or 6 maggots. Under treatment with chloroform, carbolic, and terebinthine lotions, and menthol vapour 70 maggots came away in the course of 5 days, and although the palate and after part of the nasal fossae were considerably damaged and part of the nasal septum was destroyed all the lesions healed very quickly after their removal. The determination of the maggots as *Chrysomia dux* was made by ROUBAUD.

A. A.

JOURNAL OF THE DEPARTMENT OF AGRICULTURE. Pretoria. 1924. Apr. Vol. 8. No. 4. p. 416. **Destruction of Blow-Fly Maggots : an Experiment.**

An observation from South Africa of a carcase heavily infested with blowfly maggots from which wonderfully few flies issued ; about 60 per cent. of the pupae had been destroyed by a Chalcid parasite.

A. A.

KEILIN (D.). **On the Life History of** *Neottiophilum praeustum* **(Meigen 1826) (Diptera-acalypterae) parasitic on Birds, with Some General Considerations on the Problem of Myiasis in Plants, Animals and Man.**—*Parasitology.* 1924. Jan. Vol. 16. No. 1. pp. 113–126. With 1 plate & 3 text figs. [29 refs.]

In this paper are described, for the first time, the structure of the egg, larva, and pupa of *Neottiophilum praeustum*, an Acalypterate fly, the larvae of which inhabits the nests of various birds and feeds intermittently upon their blood.

From his observations of the anatomy of the larva of this and many other cyclorraphous species the author propounds the general statement that those larvae that live on decomposed organic matter have the pharynx provided with longitudinal ridges, while those that feed upon living tissues, of animals and plants, do not possess these ridges.

A. A.

BATHELLIER (Jean). **Premiers résultats zoologiques de l'étude des rats et des puces à Phnom-Penh.** *Bull. Soc. Path. Exot.* 1924. May. 14. Vol. 17. No. 5. pp. 372–375. [2 refs.]

The plague mammals of Phnom-Penh (Cambodia) are *Mus decumanus* and *rattus* and the musk-"rat" (*Crocidura sp.*); of 400 specimens collected 55·5 per cent. were *decumanus*, 40 per cent. *rattus*, and 4·5 Crocidura; *decumanus* is the rat of the crowded parts of the town, *rattus* is suburban. Fleas were comparatively few; only 49 were collected, of which four-fifths were *Xenopsylla cheopis* and one-fifth *X. astia*.

A. A.

KENYA. Colony and Protectorate of; **Annual Report of the Bacteriological Laboratory for the Year 1922. Vol. XIII.** [KAUNTZE, (W. H.). Senior Bacteriologist.]—Section 9. Rat Fleas. pp. 190–192. With 1 chart.

Rat fleas systematically collected in Nairobi were fewest in April and November (wet months) and most numerous in January and June (dry months). Of 3,105 fleas from 1,146 rats, 1,862 were *Xenopsylla cheopis* and 974 *X. brasiliensis*.

A. A.

PETTIT (R. H.). **Report on the Section of Entomology.**—*61st Ann. Rept. Michigan State Bd. Agric. 1921–22.* East Lancing, Mich., 1923. pp. 211–214. [Summarized in *Rev. Applied Entom.* 1924. July. Vol. 12. Ser. B. Pt. 7. p. 105.]

Records finding of *Xenopsylla brasiliensis* on rats in Michigan.

A. A.

DUNN (Lawrence H.). **Life History of the Tropical Bedbug, *Cimex rotundatus*, in Panama.**—*Amer. Jl. Trop. Med.* 1924. Jan. Vol. 4. No. 1. pp. 77–83.

These observations of the life-history of *Cimex rotundatus* were made in Panama in January, on the issue of 25 fresh-laid eggs.

Eggs hatched after 5 or 6 days, and many larvae fed within 6 hours of emergence. Larvae moulted to 1st nymph stage within 4 or 5 days; the three successive moults into the 2nd to 4th nymph stages occurred severally within the 3rd to 5th days of each stage, and the 5th (final) moult into the adult stage on the 5th to 8th day after the 4th nymph stage. Pairing might take place within 24 hours of assuming the adult stage and egg-laying on the 3rd day after. The longevity of active reproductive females ranged from 23 to 167 days, and the term of actual egg-production from 40 to 94 days. The maximum number of eggs laid by a single female was 439, and the minimum 82; the maximum number laid by a single female in 24 hours was 10. Females seemed to feed as much after the cessation of reproductive life as during the period of egg-production.

A. A.

HALL (Maurice C.). **Lesions due to the Bite of the Wheel-Bug,** *Arilus cristatus* **(Hemiptera ; Reduviidae).**—*Arch. Intern. Med.* 1924. Apr. 15. Vol. 33. No. 4. pp. 513–515.

A good many species of Reduviid bugs are known to have inflicted painful bites on man, bites causing local inflammation, vesiculation and often even ulceration, and sometimes numbness and symptoms of shock. In the case here recorded the bite of a Reduviid, *Arilus cristatus*, was followed by a local growth of small papillomata.

A. A.

PAVLOVSKY (E. N.) & STEIN (A. K.). *Maculae coeruleae* **and** *Phthirus pubis.—Parasitology.* 1924. Mar. Vol. 16. No. 2. pp. 145–149. With 5 text figs. [11 refs.]

The blue spots caused in the skin by the bites of the crab-louse are the effect of a ferment, emanating from the insect's bean-shaped salivary glands, which appears to act upon the haemoglobin. The secretion of the horse-shoe shaped salivary glands has no such effect.

A. A.

FLETCHER (T. Bainbrigge). **Intestinal Coleoptera.**—*Indian Med. Gaz.* 1924. June. Vol. 59. No. 6. pp. 296–297.

There seems to be no doubt that in lower Bengal and the low country of Ceylon beetles do actually get into the bowel of young children and give rise to diarrhoea and gripes, perhaps leading to emaciation. These beetles belong to the Coprine sub-family of the Scarabaeid family and the species so far recognized are *Onthophagus bifasciatus* and another undetermined species of Onthophagus, and *Caccobius mutans*. How they get into the child's gut is at present a matter of conjecture; the author rather inclines to the opinion, based on the habits of the beetles and on the fact that only adult beetles have been passed, and also on the circumstances of the children, that they creep in through the anus when the child is asleep.

A. A.

BISHOPP (F. C.). **The Puss Caterpillar and the Effects of its Sting on Man.** - *U.S. Department of Agric. Department Circular 258.* Washington, D.C. 1923. Sept. 14 pp. With 12 figs. [5 refs.].

This is a full description of the "puss caterpillar" (*Megalopyge opercularis*) in all its stages. According to the author the urtication which it causes is due not to the tussocks of hairs that cover the body, but to short spines disposed on tubercles beneath the hairy coat. Contact with these spines is followed by burning pain, a papular rash which may be accompanied with much swelling, numbness, and sometimes paresis, nausea and vomiting. The severity of the symptoms depends upon the size of the caterpillar. Fresh-moulted skins and fresh-killed caterpillars will also cause mild irritation, and even the cocoon. The bacterial and Tachinid-fly parasites of the caterpillar are described.

A. A.

CLEVELAND (L. R.). **The Physiological and Symbiotic Relationships between the Intestinal Protozoa of Termites and their Host, with Special Reference to *Reticulitermes flavipes* Kollar.**—Reprinted from *Biological Bull.* 1924. Apr. & May. Vol. 46. Nos. 4 & 5. pp. 177–225. [70 refs.]

This paper may be commended to the notice of the medical profession in the tropics (where the material for experiment is so abundant and so ready) for its suggestive biochemical and other interest. It is fairly well known that the great majority of termites feed principally on wood, many of them on dry wood, and that in their intestine they harbour enormous numbers of protozoa, chiefly flagellata, with a wonderfully differentiated cytoplasm. The protozoa do not occur indiscriminately, but in generic and specific correspondences with their hosts, though one host-species may harbour several protozoon-species simultaneously. The almost obvious inference that the protozoa must be necessary to the termites, that they must perform some vital function for their hosts, probably that of digesting dry cellulose, has gradually been finding clearer expression (see this *Bulletin*, vol. 19, p. 465), and the present author now furnishes experimental proof, based on a careful investigation on one species of termites, that this inference is correct, and that these intestinal protozoa are the very pith of life for the termites that harbour them. He found (1) that he could destroy all the protozoa in an individual termite host, without immediate injury to the host, by incubating the individual for 24 hours at 36° C.; (2) that a termite so deprived of its intestinal protozoa died within 10–20 days if it were fed on its normal diet of wood, but (3) would live on indefinitely if it were fed on digested wood (in the form of humus or fungus), and (4) that if it were re-infected with its protozoa it could live on indefinitely on the ordinary diet of wood.

A. A.

WALCH (E. W.). **Over de Trombiculae, welke de Pseudotyphus overbrengen, en na verwante mijten uit Deli (2e mededeeling).** [On the Trombiculae which transmit Pseudotyphus, and Closely Related Mites in Deli, E. C. Sumatra (2nd Communication).]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 3. pp. 499–530. With 26 figs. [11 refs.]

Walch describes in detail the nymph stage of some of these parasites (*T. Schuffneri, Deliensis, pseudoakamushi, muris, Oudemansi*), and adds the description of 2 new species (*T. Keukenschrijveri* and *rara*).

W. J. Bais.

BISHOPP (F. C.). **The Rat Mite attacking Man.**—*U.S. Department of Agric. Department Circular 294.* Washington, D.C., 1923. Oct. 4 pp. [1 ref.]

Liponyssus bacoti, a common rat-mite, is known to attack man. In the circumstances here reported—namely, an unusual increase of rats in the city of Dallas, in Texas—this mite extended its attention to man to such an extent as to be a pest.

A. A.

PARKER (R. R.), SPENCER (R. R.) & FRANCIS (Edward). **Tularaemia. XI. Tularaemia Infection in Ticks of the Species** *Dermacentor andersoni* **Stiles in the Bitterroot Valley, Mont.**—*Public Health Rep.* 1924. May 9. Vol. 39. No. 19. pp. 1057–1073. [6 refs.]

Bacterium tularense has been recovered from unfed adult ticks, of the species *Dermacentor andersoni*, collected in nature in western Montana; the inference, therefore, is certain that infection must have been acquired in one of the antecedent stages of the ticks, and this must have been about 8 months before, and anterior to, hibernation. Subsequent experimental work showed that larvae of *Dermacentor andersoni* infected from a guineapig were subsequently infective in their nymph stage and in their adult stage. This tick therefore must be one of the agents that maintains the existence of *B. tularense* and also—assuming that the virulence of the bacterium is not diminished by long survival in the tick—of tularaemia.

A. A.

TOMB (John W.). **The Treatment of Scorpion-Sting.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Feb. 21. Vol. 17. No. 8. p. 520.

The author has treated many cases of scorpion sting, in India, with liquor ammoniae fortis (B.P.), and he has found that the local application of a drop or two gives immediate and permanent relief from pain.

A. A.

MESSINGER (Karl). **Ein Blutegel im Kehlkopfe.** [A Leech in the Larynx.] —*Med. Klin.* 1924. June 15. Vol. 20. No. 24. pp. 825–826.

A homely and picturesque, if somewhat prolix, account of a countrywoman who had accidentally imbibed a leech six days before she was brought to the writer. She had been incessantly choking and coughing up blood all that time and she was in a state of livid pallor and utter collapse when brought in. Owing to the blood and the incessant spasmodic cough location of the leech—beneath the vocal cords—was difficult, and extraction—under cocain—extremely precarious. Forceps could not keep hold of the slippery beast, and when at last it was loosened by the application of a tampon soaked in strong solution of salt, it fell into the trachea. Then, with an explosion that made the patient's eyes bulge, and nearly choked her, it was shot out in a gush of blood. Coughing continued for a short time and a few clots were brought up, but a little morphia finally gave relief.

A. A.

FORNARA (L.). **Note sur un cas de localisation sous-arachnoidienne d'une larve de Porocéphale.**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1924. Jan. Vol. 3. No. 3. pp. 233–236.

This is a report of a case which in life, as in its post-mortem revelations, was a typical acute meningitis, the subject being a native African boy of 14 years. The only peculiar circumstance was the occurrence, in a string of purulent fibrin adherent to the convexity of the right occipital lobe, of a larva of *Porocephalus* (*Armilliger*) *armillatus*, 78 mm. in length, the causal relation of which to the sero-purulent meningitis is, as the author more than hints, a matter of argument.

This is the third case of parasitism of Porocephalus in the human subject that the author has encountered, the other two being abdominal.

A. A.

ESCOMEL (Edmundo). **Parasitologia de Arequipa y sus alrededores.** [Parasitic Affections of Arequipa and its Environs.]—*Cronica Méd.* 1924. Feb. & Mar. Vol. 41. Nos. 728 & 729. pp. 37–44; 72–78. With 9 text figs.

The author gives in these two papers brief accounts of parasitic conditions met with in man and animals in Arequipa (7,600 feet) and its environs. The fact that in fifteen pages he deals with trematodes, cestodes, nemathelmia, mites, bugs, fleas, ticks, mosquitoes, simuliidae and tabanidae; also with mycoses and mycetomas, telosporidia and sporothrices, is sufficient to indicate that the information regarding each is somewhat meagre.

Fasciola hepatica is very common in sheep but no case has been met with in man; *Taenia solium* and *T. saginata* both occur and *Coenurus cerebralis* is seen at the slaughter-house. Of the nematodes Ascaris and Oxyuris are fairly common in man, and Belascaris and Toxascaris in the cat and dog respectively. Necator is said not to exist because the climate will not permit of its development; the absence of Trichuris is ascribed to the same cause. Strongyloides infection, however, is frequent and is said to be the cause of cyclical diarrhoea.

Of Arthropods mention is made of *Demodex folliculorum* var. *hominis* and *Sarcoptes scabiei*. *Ornithodorus megnini* is met with frequently in the external auditory meatus. Reduviid bugs are from time to time introduced by travellers but do not propagate. To the relative freedom from *Pulex irritans* the author ascribes the absence of plague from Arequipa. Culex and Anopheles come up from the valleys by train, but being unable to adapt themselves to their new surroundings they perish a short distance from the railway and do not cause disease in man. With the exception of a brief record of three cases of actinomycosis of the lung, all terminating fatally, the remaining part of the papers contains little of interest.

H. Harold Scott.

NUTTALL (George H. F.). **The Anomalous Position of Parasitology in the Medical Curriculum in England.**—*Parasitology.* 1924. Mar. Vol. 16. No. 2. pp. 248–250.

Here are to be found some trenchant remarks upon the ignorance of parasitology (bacteriology excluded from the charge) prevalent in the medical profession. The generality of medical students learn next to nothing of it beyond what they pick up in their preliminary course in zoology, and even the professionally-qualified men who take the courses for the D.T.M. & H. cannot learn much in the short statutory courses provided. The remedy here proposed is that a course of instruction in parasitology should be included in the ordinary curriculum of the medical schools: the course must have its limits, but the student should at least learn how to collect and preserve material and how to prepare films and specimens of faecal and other discharges.

A. A.

FARAKER (Erskine). **Anaphylaxis to Antivenom Serum.** [Memoranda.]—*Brit. Med. Jl.* 1924. Apr. 5. p. 626.

In this case an Indian lad having been "bitten by something" and ten minutes afterwards received an intravenous injection of Kasauli antivenom, immediately collapsed. He became extremely agitated, thirsted for air and for water, complained of burning chest and epigastrium, swelling of eyes and throat, and tingling all over the body. The pulse could not be felt and the respiration increased to 60. After appropriate treatment, which included adrenalin, digitalin, and strychnine, he slowly recovered, the axillary pulse not being palpable for more than two hours and the radial for more than three. The antivenom came from a batch of ampoules one of which had been used only a few days before with entirely satisfactory results.

A. A.

FERRI (Giorgio). **Esperienze sul morso e l'avvelenamento viperino.** [Observations on the Bite and the Venom of the Viper.]—*Bol. d. Istituto Sieroterap. Milanese.* 1924. May. Vol. 3. No. 3. pp. 191–195. English summary p. 195.

There is nothing novel in this paper beyond the experimental observations that the ripe sporiferous tissue of the field mushroom is toxic when injected subcutaneously, and the verification by the author of the observation of PHISALIX that the injection of the watery extract of this mushroom-tissue imparts to laboratory animals a slight degree of immunity to viper venom.

A. A.

BLACKLOCK (B.). **Larva of the Tumbu-Fly** *Cordylobia anthropophaga* **in the Lower Eyelid.** [Miscellanea.]—*Ann. Trop. Med. & Parasit.* 1924. Aug. 2. Vol. 18. No. 2. p. 239. With 1 plate.

BUXTON (P. A.). **A Key to the Fourth Stage** *Anopheles* **Larvae of Palestine.**—Reprinted from *Bull. Soc. Roy. Entom. d'Egypte.* 1923. Feb. 14. pp. 45–50. With 6 text figs.

CHALON (G.). **Présence d'***Ornithodoros Savignyi* **(Audouin) à Ouargla (Sahara algérien).**—*Bull. Soc. Path. Exot.* 1923. Dec. 12. Vol. 16. No. 10. pp. 741–742. [6 refs.]

CHARRIER (H.). **Les moustiques de la région de Tanger (Maroc).**—*Bull. Soc. Path. Exot.* 1924. July 9. Vol. 17. No. 7. pp. 570–572. [7 refs.]

DELANOË (P.). **Les diverses espèces de rats constatées dans les Doukkala et plus particulièrement à Mazagan. De la rareté du surmulot.**—*Bull. Soc. Path. Exot.* 1924. July 9. Vol. 17. No. 7. pp. 584–589. [1 ref.]

SINTON (J. A.). **Notes on some Indian Species of the Genus Phlebotomus. Part III. Provisional Diagnostic Table of the Males of the Species and Varieties recorded from India and Ceylon. Part IV.** *Phlebotomus himalayensis,* **Annandale 1910.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 807–816. With 1 plate. [18 refs.] pp. 817–824. With 1 plate. [3 refs.]

TALIAFERRO (W. H.) & BECKER (Elery R.). **A Note on the Human Intestinal Amoeba,** *Dientamoeba fragilis.*—*Amer. Jl. Hyg.* Baltimore. 1924. Jan. Vol. 4. No. 1. pp. 71–74. With 2 text figs. [9 refs.]

YAWS.

ALDERSON (Harry E.). **[Report of a Case of Yaws in California.]**—*California State Jl. Med.* 1923. Apr. [Summarized in *Arch. Dermat. & Syph.* 1924. May. Vol. 9. No. 5. p. 623.]

From the title one might be led to believe that this note referred to an indigenous case of yaws; it is, however, the first case of yaws diagnosed in California—a Filipino fireman on a ship who had become infected from the Filipino ship's cook. A point of interest is that the first eruption, that on the face, appeared while he was in England. There was general adenopathy and the Wassermann test was +++. Lesions showed the presence of *Sp. pertenue.* All the lesions rapidly disappeared after 3 doses of arsphenamin.

H. S. Stannus.

PENRIS (P. W. L.). **De frekwentie van framboesia en van positieve serumreactie (Sachs-Georgi) bij verschillende landaarden.** [The Prevalence of Yaws and of Positive Seroreactions (Sachs-Georgi) in Different Races.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 1. pp. 48–58. [1 ref.]

Penris points out that in the Dutch East Indian army tertiary yaws is often confounded with tertiary syphilis. 775 native soldiers were questioned as to a history of yaws and examined for marks of this disease. 260 (33 per cent.) had certainly suffered from yaws before, 170 (22 per cent.) were suspicious in this respect, in 345 (44 per cent.) there existed no reason for such a suspicion. The greatest prevalence was found in Amboinese and Achinese soldiers. Accordingly, of 320 soldiers without syphilis in their history 42 per cent. showed a positive sero-reaction (Sachs-Georgi) (Amboinese 59 per cent., Achinese 71 per cent.). The author rightly insists that the value of the Sachs-Georgi test must be judged not by its degree of correspondence with the Wassermann test but by its clinical usefulness.

W. J. Bais.

ONG KIE HONG (H. F.). **Invloed van hooge koorts, veroorzaakt door pokken op framboesia tropica.** [Influence upon Yaws of High Fever in the Course of Smallpox.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 1. pp. 181–182.

In two children of 6 and 8 years, suffering from smallpox, the pre-existing papular eruption of yaws dried up and healed during the convalescence from the smallpox.

W. J. Bais.

GUTIERREZ (P. D.). **Keratosis Palmaris et Plantaris due to Frambesia.**—*Arch. Dermat. & Syph.* 1923. Sept. Vol. 8. No. 3. pp. 382–392. With 10 text figs. [3 refs.]

Three cases are reported with a brief account of this complication occurring in 50 per cent. of cases attending the yaws clinic in Ilocos Norte, Philippine Isl. Two main lesions are described: (1) claviform keratosis, and (2) simple thickening of the corneal layer. Commencing

as areas of hyperpigmentation on one or both palms or soles and extending peripherally, the hyperkeratotic lesions later show depigmentation and an appearance of leucoderma. The condition usually occurs from one to five years after the end of the secondary stage of the disease; the Wassermann reaction is variable. Histologically the changes are confined to the epidermis. Improvement in all cases is slow even under treatment with the arsphenamin preparations and iodides.

W. Jenkins Oliver.

NICOLAS (Felisa). [In English and Spanish.] **Notes on the Nose and Throat Manifestations of Tertiary Yaws. Manifestacions terciarias de la frambuesia tropica o bubas en la nariz y garganta.**—*Jl. Philippine Islands Med. Assoc.* 1924. Apr. Vol. 4. No. 4. In English pp. 140–142. In Spanish pp. 163–164.

The author briefly refers to the types of lesions met with among patients at the Manila Hospital dispensary, which occurring in the nose and throat could be diagnosed as framboesial. He mentions the ever-present impossibility of making a differential diagnosis between this disease and syphilis either clinically or by means of the Wassermann reaction and bases his diagnosis on the past history and the district whence the patient comes. The earliest lesion is probably an infiltration of the nasal septum, while the late stages go on to the condition known as rhinopharyngitis mutilans. Treatment by means of neosalvarsan is very satisfactory in the earlier cases. Potassium iodide is useful but much slower in action.

H. S. S.

i. DAVEY (J. B.). **Further Report upon Treatment with Bismutho Sodium and Potassium Tartrate.** *Appendix No. iii.*—*Tanganyika Territory Ann. Med. Rep. for the Year 1922.* pp. 82–89.

ii. KENYA, Colony and Protectorate of. **Annual Report of the Bacteriological Laboratory for the Year 1922. Vol. XIII.** [KAUNTZE (W. H.). Senior Bacteriologist.]—p. 158; 200–201. With 1 chart.

iii. KENYA MEDICAL JOURNAL. 1924. Apr. Vol. 1. No. 1. pp. 25–26.—**Preliminary Report on a New Bismuth Preparation for the Treatment of Yaws.** [PUGH (J.)].

iv. ——. *Ibid.* pp. 26–27. With 1 plate.—**A Case of Para-Framboesia?**

i. The Principal Medical Officer of Tanganyika Territory refers to an attempt to prepare locally the double salt, sodium potassium bismuth tartrate, and the results obtained by its use in the treatment of cases of yaws. Now, at an interval of two years, the results mentioned have little value except perhaps to serve as a warning of the danger which may attend the use of locally prepared drugs of uncertain nature.

ii. In the second communication (pp. 200–201) V. H. KIRKHAM gives his experiences in trying to prepare the same double salt as first suggested by the Acting P.M.O. Tanganyika Territory and then gives a fairly detailed statement of the method now in use, which is quoted below:—

"Bismuth oxycarbonate is heated in a dish over a bare flame, and stirred until it assumes an orange colour indicating its conversion into bismuth

oxide. Rather more than the theoretical quantity of tartaric acid required to convert this into bismutho-tartaric acid is added. Sufficient boiling water is then added to bring the mass into the consistency of a batter. It is placed on the water bath and stirred vigorously. In a few minutes the colour will commence to fade, and then quite rapidly it will turn white and almost solidify.

"When the reaction is complete the mass is transferred to a Büchner filter and drained at the pump. The excess of tartaric acid is removed by washing with a little hot water—bismutho-tartaric acid being only slightly soluble.

"The B.T. acid is then transferred to a dish, and treated with slightly less than the theoretical quantity of sodium hydroxide and potassium hydroxide in molecule proportions. It is most important that the alkalis be in solution of syrupy consistency, otherwise the reaction with the B.T. acid will be delayed. The reaction should be violent and hence the alkali be added piecemeal.

"When all has been added, the B.T. acid will almost have entirely disappeared into a syrupy solution with the reaction to litmus slightly acid. Filter off and concentrate the filtrate on the water-bath until a persistent film appears on the surface.

"Then pour into three volumes of alcohol and stir vigorously. In a few minutes the paste at the bottom will harden and crystallise. After standing for an hour or two the alcohol may be poured off and the crystalline mass broken up in a mortar.

"The powdered crystals may be then left under a small quantity of fresh alcohol for a further period, filtered at the pump, pressed, dried on porous tiles and finally in the steam oven.

"Simple as it may appear, and is with practice, there are several places where danger lurks. The crux is the amount of water. In no part of the procedure should more water be present then is necessary to bring the bodies into reaction. It does not enter chemically into the reactions required, but if a little too much is present, it appears to upset their course and bodies of lower bismuth content result. Also note that if even a slight excess of alkali be added, the salt will not crystallize out under alcohol, but the syrup remains permanently as such.

"It is essential that frequent analysis be made—in this department every batch is assayed.

"As Sod. pot. bismutho-tartarate is not decomposed by alkali the bismuth content may be obtained by titration with standard sodium sulphide solution, using sodium nitro-prusside as an outside indicator."

This is the preparation which has been so largely used in Kenya, the results of which were dealt with by Dr. GILKS [this *Bulletin*, vol. 21, pp. 364.]

The author of the Kenya Bacteriological Report also refers (p. 158) to the present impossibility of making a differential diagnosis between syphilis and yaws by means of serum reactions and then gives the comparative results in a small series of cases obtained by means of the Wassermann and Sigma tests, but it is not clear whether these were cases of yaws or syphilis.

iii. A short note giving the advantages and disadvantages of the treatment of yaws [37 cases] with a preparation of precipitated metallic bismuth in 50 per cent. glucose solution, each dose containing 0·2 gm. precipitated bismuth. [The method of preparation of the locally made drug, the details of making the injection, and the type of cases treated are not mentioned.]

iv. A clinical note upon a case which figures as the frontispiece of this new venture in medical journalism. The writer suggests that the lesions, including the absorption of the phalanges so that some of the fingers are "merely represented by small button-like bodies" are due

to a para-framboesial affection of the nervous system. [In the absence of any other evidence than that produced the diagnosis would appear doubtful; no mention is made of leprosy.]

H. S. S.

i. VAN DEN BRANDEN (F.) & VAN HOOF (L.). **Le tartrobismuthate de potassium et de sodium soluble et neutre dans le traitement des affections pianiques.**—*Ann. Soc. Belge. de Méd. Trop.* 1924. Jan. Vol. 3. No. 3. pp 327–336. [6 refs.]

ii. VAN NITSEN (R.). **Le traitement du pian et la réaction de Bordet-Wassermann.**—*Ibid.* pp. 273–301.

i. The authors, having abandoned the use of a substance resembling Trépol on account of the pain produced locally by injection, give the results obtained since 1922 when the bismuth compound above mentioned was introduced. Sixty-four natives from the environs of Leopoldville were treated by intramuscular and intravenous injection of solutions containing from 1 to 4 per cent. of this salt, which contains 33·8 per cent. of metallic bismuth. The doses varied from 0·05 gm. for a child of 10–15 kilos to from 0·1 to 0·4 gm. for an adult, the total amounts given being from 0·15 to 1·5 gm. for a child and from 0·4 to 1·5 gm. for an adult. The immediate clinical results were good but cases passed out of observation immediately and the ultimate results of treatment as regards permanent cure and effect upon the Bordet-Wassermann reaction remain uncertain. Mild gingivitis and neuralgia of the mandibular branch of the trigeminal nerve were the only symptoms of intolerance noted.

ii. As the result of observations made on 50 cases during two years in Katanga (where yaws is uncommon) the author finds that tartar emetic is uncertain in its curative action (7 cases); stibenyl is useless (1 case); potassium iodide must be given over long periods and in large doses; arsenobenzol derivatives give the best results with a minimum total dose of 3·5 gm. or sulpharsenol 4·5 gm. [Bismuth was not used apparently.]

His conclusions with regard to the Bordet-Wassermann reaction in yaws are that no differential diagnosis can be made by this means between this disease and syphilis; the reaction becomes positive at an earlier stage in yaws than in syphilis; a negative may become a positive during treatment; the change from positive to negative as the result of treatment generally follows the disappearance of the clinical manifestations, but cases of persistent positive reactions were met with as in syphilis.

No cases were traced over sufficiently long periods to really justify the inference of cure or permanence of the negative Wassermann reaction.]

H. S. S.

DANET & BEURNIER. **Note sur le traitement du pian par les sels de bismuth.**—*Bull. Soc. Path. Exot.* 1924. June 11. Vol. 17. No. 6. pp. 502–503.

The authors report favourably on the results obtained by treating yaws (38 cases) with bismuth salts. Cure [by which is presumably meant disappearance of symptoms] was obtained in from 10–30 days, without any untoward symptoms. [No details given.]

H. S. S.

Reid (C. B. B.). **Continuation Report on the Treatment of Yaws.**—*Appendix No.* iv—*Tanganyika Territory. Ann. Med. Rep. For the Year 1922.* p. 89.

In the district abutting on the north end of Lake Nyasa 800 cases were treated, some apparently with neokharsivan, but the majority with weekly intravenous injections of tartar emetic, with excellent results. Intramuscular injections of mercury cream were also given, but no reason is furnished. [Mercury according to the general consensus of opinion has no beneficial effect in yaws: on the other hand, it would be useful in cases of syphilis undifferentiated from yaws.]

H. S. S.

Dye (W. H.). **Comparative Results in the Treatment of Framboesia Tropica in Northern Nyasaland.**—*Jl. Roy. Army Med. Corps.* 1924. Apr. Vol. 42. No. 4. pp. 280–286.

After brief reference to the distribution of yaws in the North Nyasa district and to native nomenclature, the author states of the signs and symptoms of the disease as he met with it "these have not materially differed from the usual textbook description." He mentions that he saw only one instance of pitted palms among some hundreds of cases, but that dactylitis and a condition he refers to as pseudo-mycetoma are very common. He then deals with the comparative results of treatment by various drugs, the object of his investigation being to find an efficient method of treatment at small cost.

His findings are as follows:—

(1) Novarsenobillon: two intravenous injections of 0·3 and 0·6 gm. respectively, at a week's interval, gave good results, and no recurrences up to 12 months in secondary cases; in the tertiary disease a third injection of 0·6 gm. was necessary to effect good and rapid results.

(2) Galyl: three injections of 0·3 gm. at 4 day intervals for secondary cases and six injections for tertiary were satisfactory.

(3) Potassium iodide: one drachm thrice daily for 15 days in adults and in children 20 grains twice daily for three weeks effected a cure in secondary cases; for tertiary cases treatment had to be continued for two months.

(4) Castellani's mixture: this the author does not recommend.

(5) Antimony tartrate: daily increasing doses over five weeks gave only moderately good and somewhat erratic results in secondary cases, while with tertiary disease it was a useless method.

(6) Antimony and N.A.B.: this method allowed a saving of the more expensive drug but was only useful in earlier cases.

(7) Antimony and potassium iodide: in the same way a saving in iodide is made.

(8) Arsenobenzol and iodide of potassium: this combination gave the best results but is the most expensive.

A table of relative costs of treatment is given and the author's final conclusions are that for children pot. iod. is the most useful remedy; for adults he advocates novarsenobenzol and antimony as the routine method of treatment in secondary cases and pot. iod. or N.A.B. in fuller doses for tertiary cases.

[No statistics are given, so that the reader is unable for himself to judge of the results. Apparently, too, Captain Dye has not tried the treatment with bismuth salts which has been used with success and economy on a big scale in other East African colonies and elsewhere.]

H. S. S.

IKEGAMI (Yutuka). [**A Contribution to the Study of Immunity from Frambesia Tropica.**]—*Hifuka Kiyo (Arch. of Dermat.)* 1923. Nov. Vol. 2. No. 2. [Summarized in *Japan Med. World.* 1924. June 15. Vol. 4. No. 6. p. 134.]

The author reports two cases of framboesia in whom after cure of the initial lesions by salvarsan re-inoculation was negative.

[The inference is not clear, but the author appears to imply that the patients had developed an immunity to inoculated yaws, whereas on the analogy of syphilis it would seem more likely that both patients were not really cured but still suffering from the disease and therefore could not be re-inoculated.]

H. S. S.

SYPHILIS IN NATIVES OF WARM COUNTRIES.

NOGUE (M.). **La Syphilis chez les indigènes du Sénégal. La lutte contre la syphilis à Dakar.**—*Ann. d'Hyg. Publique, Industrielle et Sociale.* 1924. Mar. New Ser. No. 3. pp. 149–173. With 4 text figs. [40 refs.]

In this important paper, which everyone should read who is interested in the problem of syphilis among native races, the author as médecin-chef of the native hospital as well as of the venereal clinic at Dakar has been able to correlate two aspects of the problem, viz., the part syphilis plays in the causation of chronic disease which brings the native to the hospital and the type of syphilitic lesion for which he seeks treatment at the venereal clinic.

M. Nogue believes that the conditions prevailing in Dakar are a fair index of those to be found throughout Senegal and Soudan. Among patients under treatment for other diseases than syphilis and showing no signs of that disease the Bordet-Wassermann Reaction gave 52·77 per cent. positive results. This the author believes to be a correct indication of latent syphilitic infection, and it is interesting to note that he does not allow that malaria may be a possible factor in this high figure; even when the serum has been taken during the febrile stage he holds that it in no way interferes with the specificity of the reaction. Yaws is practically excluded—only four cases were seen in four years.

The primary chancre and early ulceration in the throat are but seldom seen, nor does the native seek treatment for mucous plaques and condylomata. The symptoms for which he does seek medical advice are the nocturnal headache and bone pains of the early tertiary period.

The clinical side is pretty fully dealt with, and the following points may here be noticed. Epitrochlear adenitis is considered an important sign. Contrary to what has been held by some European authorities, tertiary lesions are often multiple, pleomorphic and widely disseminated; cases may show evidence of visceral lesions and cutaneous manifestations at the same time.. Cardio-vascular syphilis, especially aortitis, is common, as is visceral syphilis generally; but considerable difficulty may exist in differentiating the various factors underlying some conditions where this disease co-exists with chronic malaria, with multiple helminth infection, ankylostomiasis, bilharziasis, with tuberculosis, with alcoholism, etc. Attention is also drawn to the probable part played by these other toxi-infections in determining the virulence of the syphilitic manifestations.

It is interesting to note that 11 cases of primary carcinoma of the liver were seen since 1919 thus corroborating other observers as to the relative frequence of hepatic growth among native Africans.] Eight cases of juxta-articular nodules were met with, and in all these persons, with one doubtful exception, the presence of active syphilis was established. Cerebro-spinal syphilis was uncommon, occurring chiefly in the form of spastic paraplegia and hemiplegia, but no case of tabes, general paralysis of the insane or Argyll-Robertson pupil was seen. Miscarriage and premature death among infants, due to the disease, are common.

Among 850 children in public schools, 6·8 per cent. showed evidence of hereditary syphilis. Interstitial keratitis is rare, as also are cutaneous lesions among these cases; the commoner signs are coryza, rhagades, enlargement of spleen and liver, osteitis and arthritis, hydrocephalus. It is probable, too, that the disease is very often acquired during childhood. No details are given of the routine treatment adopted, but novarsenobenzol, mercury, bismuth and potassium iodide are mentioned.

The author refers to the difficulties of coping with this scourge but looks forward with hope to good results in the future.

H. S. Stannus.

BARTHOLOMEW (R. A.). **Syphilis as a Complication of Pregnancy in the Negro: Analysis of Three Hundred Cases; Results of Anti-syphilitic Treatment; Dark Field Examination as Aid in Diagnosis of Fatal Syphilis at Necropsy.**—*Jl. Amer. Med. Assoc.* 1924. July 19. Vol. 83. No. 3. ppl 172–174. [13 refs.]

A paper giving the observations made by the author at the prenatal clinic and lying-in hospital of the Emory division of the Grady Hospital, Atlanta, which is best epitomized in his own summary:—

"A comparison of the pregnancies of 100 non-syphilitic, untreated syphilitic and treated syphilitic patients, respectively, taken from a clinic in the south east in which at least one third of the patients are syphilitic, showed three times as many abortions and premature labors and seventeen times as many stillbirths in the syphilitic as in the non-syphilitic: prenatal treatment with an average of 1·14 gm. of arsphenamin and 0·04 gm. of mercuric salicylate from an average of 7·4 months on to term, resulted in one half as many premature births, one third as many stillbirths, one seventh as many abortions, and one ninth as many infant deaths up to ten days, as in the untreated cases.

"The dark field examination of a suspension of liver tissue obtained at necropsy or aspirated from the liver is a valuable aid in diagnosing syphilis in babies stillborn or dying after birth, and was in agreement with the maternal Wassermann reaction in from 65 to 70 per cent. of the cases. This procedure may show the presence of spirochetes when all other evidences are lacking, but failure to find the organisms does not prove the absence of syphilis."

H. S. S.

DECROP & SALLE. **Accidents et résultats de la médication arsénobenzolique intra-veineuse. A propos de dix mille observations recueillies au Dispensaire Antisyphilitique de Fez.**—*Ann. des. Malad. Vénériennes* Paris. 1923. Dec. Vol. 18. pp. 897–923. With 3 plates. [2 refs.]

The value of these observations lies in the fact that they refer to large numbers—ten thousand individual cases of syphilis and close

on eighty thousand intravenous injections. The drug used was novarsenobillon except during part of last year when rhodarsan was introduced. A progressively increasing dosage was employed given in concentrated solution. All cases were controlled by the Wassermann reaction and complete records kept.

The untoward results, which were observed and carefully recorded, are divided into three groups.

A. Reactions due to the disease: focal reactions 29; apoplectiform stroke 3; abortion 4; early jaundice, which cleared up under further treatment, 6.

B. Reactions due to intolerance:—nitritoid crises 84; later generalized symptoms 114; various skin eruptions 60; rapid spread of pyogenic infections of the skin 15.

C. Toxic reactions due to the drug used:—four cases of nitritoid crises occurred in patients treated with a certain batch of N.A.B. who exhibited no unusual manifestations under previous and subsequent treatment by other batches of N.A.B.

The three cases designated under apoplectiform stroke occurred in patients suffering from neurosyphilis, and all were fatal, but these were the only mortal accidents in the whole 10,000 cases. In only eight cases was it necessary to discontinue treatment by N.A.B. and in only four was treatment by these preparations unsatisfactory.

There is little reference to the clinical side, but the frequency of extra-genital chancre, of infection during childhood, of the disease being transmitted to many members of a family is noted, and attention is called to the preponderance of skin, gland, bone and joint lesions and to the invisible transformation of secondary into tertiary manifestations.

The results of this crusade against syphilis in Morocco, where 75-80 per cent. of the population is infected, are already visible in the comparative rarity of those gross lesions which were so common a few years ago.

H. S. S.

HAZEBROEK (F. E. A.). **De klinische beteekenis van den uitslag van het serologisch onderzoek.** [The Clinical Significance of the Result of Serologic Examination.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 1. pp. 116–150.

Hazebroek emphasizes the shortcomings of the serological syphilis diagnosis and supports his opinion by quotations from various writers on this subject. The faults of technique that give rise to mistakes are discussed in detail. Stress is laid upon the necessity of considering before all the clinical aspect of a case and to treat the syphilis and not the Wassermann test. The writer gives his personal experience of the Sachs Georgi test and the formol test of Gaté and Papacosta, not of the Wassermann test. Both tests are in his hands more sensitive to latent yaws than to latent syphilis, which renders a positive reaction in the tropics far less important than it is in Europe.

W. J. Bais

DE FREITAS (Q. B.). **The Wassermann Reaction in the Diagnosis of Mental Diseases of Syphilitic Origin.**—*British Guiana Med. Ann. for 1923.* pp. 68–70.

The author gives a list of 55 persons "suffering from various types of insanity," upon whom Wassermann tests were made during the years

1913-15. No mention is made of which types of cases gave positive, negative or doubtful results.]

H. S. S.

MEDICAL RESEARCH COUNCIL. Privy Council Special Report Series No. 78. **The Serum Diagnosis of Syphilis. The Wassermann and Sigma Reactions compared.**—171 pp. With 7 figs., 19 graphs and 15 charts. 1923. London: Published by H.M. Stationery Office. [Price 5s. 6d.]

This paper cannot be summarized: one can give only an indication of its scope and quote some of its contributors' independent conclusions: they are of the greatest importance to pathologist and clinician.

Part I (A) consists of an analysis of the results obtained in the comparison of the Wassermann and Sigma Reactions in the same serums: 894 specimens of serum from 571 individuals. The authors conclude that:

(1). An approximately equal number of positive results is obtained by these two reactions in untreated cases of manifest syphilis.

(2). In treated cases the Sigma reaction gives a larger number of positive reactions than the Wassermann reaction; particularly obvious in cases giving small Sigma unitage.

(3). When results of the two reactions are expressed quantitatively they do not in some cases run parallel; although there is usually a rough correlation between both strong and weak reactions with each test.

(4). In supposed non-syphilitic cases one or other of the reactions was positive on 7 occasions—in 4 of these both reactions agreed.

In Part I (B) technical methods of the Sigma (Σ) Reaction are fully and painstakingly described.

Part II consists of the details of a further comparison by other workers between results obtained by the Wassermann test of (a) HARRISON and (b) FLEMING, and by the Flocculation test (Σ reaction) of DREYER and WARD.

They conclude that: (1) the great majority of the results of the examination of 1,342 serums by the three methods show complete or almost complete agreement.

(2). Divergencies usually occurred in serums of low Sigma readings. It is a distinct advantage that the Sigma method assigns to such serums a definite value in units. A low Sigma reading does not prejudice the mind of the physician, and enables him to assess the value of the finding in conjunction with the clinical features of the case. By this technique the main errors of the Wassermann reaction, with its inconstant haemolytic system, will be avoided. Sometimes Sigma readings sufficiently high to warrant a diagnosis of active syphilis have been obtained while the Wassermann methods gave negative findings; in a few cases the very reverse occurred. Probably the reacting body concerned in the different tests is not identical in such cases. There is also a regular fall of the Sigma findings if treatment has been sufficient and continuous, and in many cases the Sigma readings persist longer than positive findings by the Wassermann methods. The regularity of the curve testifies to the accuracy of the Sigma technique, and the longer persistence to its greater sensitiveness.

(3). In non-syphilitic sera the Sigma technique seldom gives a positive reaction, while the other methods more often do.

(4). The Sigma technique gives a method of determining the progress of a case of syphilis under treatment, and the effect of various remedies on the Sigma readings—all which is impossible by any method not giving quantitative results.

(5). The Sigma findings seem to correspond in a remarkable way with the intensity of the clinical features of the disease and are sufficiently accurate for all clinical purposes.

(6). It is abundantly proved in this report that a negative finding by any of these methods does not warrant the conclusion that the patient is free from the disease.

(7). The value and accuracy of the Sigma findings depend on the constancy and the keeping properties of the antigenic solution and on the uniformity of the technique.

Finally, Part III gives the details and results, by yet other workers, of comparative tests of 1,500 serums by Wassermann (Harrison) and Sigma Reaction.

In these workers' opinions the chief advantages of the Sigma test are:

(1). Only two reagents are employed.
(2). Much information can be obtained.
(3). The reaction is *standard*, and comparable results can be secured by independent workers.
(4). It is simple and cheap.
(5). By its routine use treatment can be made less empirical and more suited to each case.

There are two disadvantages:

(1). It is more laborious for large numbers of reactions.
(2). More serum is necessary.

H. M. Hanschell.

STUART (George). **The Value of the Sachs-Georgi Reaction in the Serological Diagnosis of Syphilis.** – *Ann. Trop. Med. & Parasit.* 1923. Oct. 13. Vol. 17. No. 3. pp. 359–375.

This work was carried out in Palestine; the Wassermann technique was that of Boas. Dr. Stuart describes his own technique for the Sachs-Georgi reaction, and in this lucid and interesting paper gives analyses of his cases of syphilis and control cases, and discusses detailed results of the tests. Some of his conclusions, based on 1,037 examinations of serums, are:—

(1). Sachs Georgi cannot replace Wassermann reaction.

(2). Advantages of Sachs Georgi reaction are:—cheapness; simplicity; and the rapidity with which strongly reacting positive serums can be read.

(3). Sachs Georgi agreeing in 86–89 per cent. of cases with Wassermann reaction has a definite value. The patient's serum must be fresh and free from contamination with organisms. The reaction should not be employed in cases of acute infectious fever; and no opinion given on results of reaction unless a detailed history of the case accompanies the serum. [To the reviewer this appears to bring in clinical sanctions and by that much render laboratory tests superfluous.] And final opinions should be given only after 18 to 24 hours from the time the reaction was set up.

(4). These treated cases, controlled throughout a full course, tend to show the Wassermann reaction remaining positive longer than the Sachs Georgi. A negative Sachs Georgi therefore in a treated case would not give a reliable index as to cure of patient.

(5). The Sachs Georgi reaction remains negative in certain definitely established cases of syphilis; and this for no apparent reason. It is justifiable therefore to conclude that a negative Sachs Georgi reaction is of little or no value.

H. M. Hanschell.

BLACKWATER FEVER.

THOMSON (J. Gordon). **Researches on Blackwater Fever in Southern Rhodesia during the Years 1922 and 1923.**—*Proc. Roy. Soc. Med.* (Sect. Trop. Dis. & Parasit.). 1924. May. Vol. 17. No. 7. pp. 47–61. With 1 chart in text. [53 refs.]

The paper opens with a short historical account of the disease, from which it appears that the great majority of observers agree that blackwater fever is the result of severe malignant malaria especially associated with the tropics and in those areas where the endemic index is high. The unanimous opinion of medical men in Rhodesia is that blackwater is an end symptom of chronic neglected and improperly treated tropical malaria. In considering the co-relation of malaria and blackwater fever there are three factors to be investigated:—(1) The seasonal incidence; (2) the association of malaria parasites with the attack, and (3) the clinical history of malaria. The author's investigations showed that the relationship between malaria and blackwater as regards seasons is very definite. In all of the twenty-three cases examined by the author in Rhodesia before the onset of blackwater, *P. falciparum* was found. The parasites and also the pigment rapidly disappeared from the peripheral blood with the onset of haemoglobinuria. In three of six post-mortem examinations crescents were found in the internal organs. In 150 cases of blackwater fever in Rhodesia, a history was obtained of repeated attacks of malaria and of irregular taking of quinine.

All attempts to discover a specific causal organism such as the *Sp. biliohaemoglobinuriae* failed. Thomson mentions that he inoculated fifteen guineapigs from fifteen separate cases of blackwater in Rhodesia and that no symptoms appeared. Reference is made to the observations of BLACKLOCK (this *Bulletin*, Vol. 21, p. 62), who inoculated himself with the blood of a fatal case of blackwater.

The author was unable to discover any difference morphologically between the malarial parasites in blackwater fever cases and those occurring commonly in malaria in Rhodesia.

W. Yorke.

NIGERIA. **Annual Report on the Medical Research Institute for the Year 1922.** [CONNAL (A.)., Director.]—40 pp. 1923. Lagos: Govt. Printer.

Reports have been received regarding 24 cases of blackwater fever (one had two attacks at an interval of 9 months) which occurred in Nigeria during 1922; there were several other cases, but details are not available: only three terminated fatally. Of the 25 attacks 22 occurred in men and 3 in women; 6 were in persons on their first tour, 6 on their second tour, 4 on their third, 2 on their fourth, 1 on his fifth, 2 on their seventh, 1 on his eighth and 1 on his ninth, respectively. There was a definite history of previous malaria in 22 cases, no records being available in three.

Details are given regarding the amount of quinine taken prophylactically by the patients. The author writes that the "data are of interest in so far as they show that in each instance the quinine used as a prophylactic failed in its object as shown by the previous tabular statement. It has to be emphasized, however, that very few took

what is usually regarded as an adequate preventive dose. Even amongst those who claimed to have taken the regulation five grains per day, there is every likelihood that the actual time of day at which it was taken varied. There is every possibility, too, that the list includes persons who put all their trust in quinine and neglected other prophylactic measures, such as the wearing of mosquito boots."

Information is also given concerning the amount of quinine taken prior to the onset of the attack of blackwater. The author states that in no case was the dosage of quinine excessive, but that it was in fact singularly small in most cases and in two it cannot be regarded as the exciting cause of the blackwater. Clinical details are given of most of the cases. The duration of haemoglobinuria in those cases in which there were neither remissions nor relapses varied from 15 to 108 hours. Only one definite remission is noted; in this case the urine became darker again on the second day. There were one or more relapses in 8 cases and details are given. Of the three cases which terminated fatally, two died from cardiac failure on the third and eighth day, respectively, and the third from suppression of urine on the seventh day.

W. Y.

VAN HOOF (L.). **Spirochètes dans des accès de bilieuse hémoglobinurique chez des Européens au Congo belge.**—*Bull. Soc. Path. Exot.* 1924. Apr. 9. Vol. 17. No. 4. pp. 291–293. [1 ref.]

Reference is made to the claim of BLANCHARD and LEFROU (this *Bulletin*, Vol. 20. p. 138) to have discovered a small spirochaete in the blood of blackwater fever cases. At the Leopoldville laboratory the blood and urine of all cases of blackwater fever have during recent years been subjected to a minute search for spirochaetes. Details are given of a case of blackwater—a European aged 45—in whose blood numerous spirochaetes were found by the triple centrifugation method. On comparing them with a preparation sent by BLANCHARD the author is convinced of their identity. The patient contracted the disease near Stanley-Pool, from whence came the patients investigated by BLANCHARD and LEFROU. Inoculations of a guineapig and monkey were without result. Information is also given concerning two other cases of blackwater in whose blood the spirochaetes were found.

The following summary is given —

1. Amongst cases of blackwater fever some exhibited in their blood spirochaetes identical with those described by BLANCHARD and LEFROU.
2. The patients were infected in the same region as those observed by BLANCHARD and LEFROU.
3. Spirochaetes were not found in the urine.

W. Y.

MILLIEN (C.). **Considérations épidémiologiques sur la fièvre bilieuse hémoglobinurique.**—*Ann. Parasit. Humaine et Comparée.* Paris. 1294. Apr. Vol. 2. No. 2. pp. 169–171. [3 refs.]

In one of the villages of Mauritius containing a population of about 600 people of all races, the author records that numerous cases of blackwater had occurred in two houses, the one constructed in 1873 and the other in 1888. During the last twenty years, 10 new cases of blackwater and a number of relapses occurred in these two houses, whilst the total number of cases in the rest of the village did not exceed 15.

The two families which inhabited the houses in question did not suffer from malaria more than the other inhabitants of the village. In a table details are given of the incidence of the cases of blackwater in the two houses. From these observations it is concluded (1) that the frequence of blackwater is not correlated with that of malaria, nor is it influenced by such factors as ignorance, poverty, fatigue and alcoholism. (2) That the cause is perhaps a vector, which can live and reproduce itself for long periods in the same house.

W. Y.

LEFROU (G.). **Considérations sur la pathogénie de la fièvre bilieuse hémoglobinurique.**—*Bull. Soc. Path. Exot.* 1924. Mar. 12. Vol. 17. No. 3. pp. 218–227. [16 refs.]

This paper is a general summary of the pathology of blackwater fever along very similar lines to the critique published by the reviewer in a recent number of this *Bulletin* (Vol. 19, p. 631). The author deals particularly with two of the most important symptoms, viz., haemoglobinuria and jaundice.

In considering the question whether haemoglobinuria is dependent on haemoglobinaemia, stress is laid on the importance of careful observation, and various faults of technique are mentioned which might vitiate the conclusion. After summarizing the literature bearing on the subject, it is concluded that haemoglobinaemia is found in blackwater. Nothing, however, is known concerning the mechanism whereby the red cells are destroyed.

In order to explain the icterus of blackwater fever it is necessary to consider briefly the pathogenesis of the various forms of jaundice —

1. *Icterus from insufficiency of the excretory canals or from obstruction.* The biliary tubes are obstructed; the liver, at first intact, becomes altered later. The urine contains pigment and bile salts; the faeces are pale.

2. *Icterus from insufficiency of the blood or haemolytic icterus.* The biliary tubes are normal, the liver is normal, but the blood is changed. The red cells from some cause or other are destroyed in enormous numbers, the haemoglobin which is set free dissociates itself and the surcharged liver cannot eliminate the pigments. The urine contains a great quantity of urobilin, bilirubin is absent or exists only in traces, the bile acids cannot be found. The serum contains much urobilin and also normal bile pigments, but no acids. The stools are deeply coloured indicating an exaggerated elimination of bilirubin.

3. *Icterus from insufficiency of the liver.* The bile ducts and blood are normal, but the liver is changed. The jaundice is due to a functional disturbance of the hepatic cells which discharge no longer into the intestine, but into the blood, all or part of the biliary elements. The urine contains urobilin pigments and bile salts, but often there is an elective retention of one of the elements of the bile. The serum reflects the composition of the urine and the appearance of the faeces varies according to the degree of retention.

The three great icteric syndromes may not be pure and the jaundice may result from a combination of the different mechanisms, such as changed liver and blood for example.

After considering what is known regarding the condition of the blood and urine in blackwater fever, the author concludes that the icterus of blackwater may be due to a blood lesion or an hepatic lesion and certainly in very many cases to both at the same time. He points out

that haemoglobinuria can occur without jaundice as in paroxysmal haemoglobinuria where icterus is very rare. The author believes that the hepatic lesion is due to the action of spirochaetes in some cases (this *Bulletin*, Vol. 20, p. 353) and in others to that of the malaria parasites.

Turning to a consideration of the part played by the spleen in blackwater, the author states that the function of this organ is two-fold; firstly in manufacturing new red cells and secondly in digesting the damaged cells. This double action results in the hypertrophy of the organ. The spleen may even play a much more important part, and numerous modern workers have suggested a pathogenic action of the spleen in haemolytic icterus; according to this theory the splenic reaction would be primary and not secondary to the blood destruction, the organ setting free the haemolysins. Such a theory merits the attention of those who are concerned with the pathogenesis of blackwater. [The paper is interesting and should be consulted in the original by those investigating blackwater fever].

W. Y.

PATERNI (Ludovico). **Contributo allo studio della emoglobinuria nei malarici.** [A Contribution to the Study of Haemoglobinuria in Malaria.]—*Policlinico.* Sez. Med. 1923. Nov. 1. Vol. 30. No. 11. pp. 543–569. With 7 figs. [69 refs.]

Details are given of three cases of blackwater fever. Two were young men and one a child of eleven. All were fatal and the post-mortem findings are recorded. The author refers at considerable length to the literature on the disease. In only one of the three cases observed by the author was distinct haemoglobinaemia observed. It is to be noted, however, that only two of these cases came under observation during the actual passage of haemoglobinuria. The author summarizes his observations in some detail, and his chief points are as follows:—

Two kinds of haemoglobinuria are seen; they are quite distinct, the first being found in malarial patients who have not taken quinine and the second in those who have taken quinine.

Haemoglobinaemia is apparently rare; in the author's three cases there was a distinct leucocytosis with a predominance of monoleucocytes.

The pathological lesions of the kidney do not consist merely in necrotic changes in the epithelium of the tubules, but sometimes distinct glomerular changes are seen, and, in addition, there may be sometimes interstitial infiltration. In fatal cases where death has occurred from anuria, casts are found in great numbers in the renal tubules; these may become less marked in cases where before death the anuria has shown signs of clearing.

The author is of opinion that the casts are not the essential cause of anuria, but that this is more particularly due to a diminished secretion of fluid. The decreased renal flow is to be associated firstly with the lesions of the renal epithelium, and, more particularly, with the glomerular changes, and secondly, with the many extra-renal causes, such as vomiting, diarrhoea, etc.

Red cells are to be found in the urinary sediment more commonly than is supposed.

The specific gravity of the urine was low in the cases examined by the author; the amount of albumen was relatively slight.

The haemoglobinuric kidney, so far as the author's observations go, clears up fairly rapidly, and does not pass into a chronic condition.

W. Y.

LABORATORY METHODS.

NITZULESCU (Virgil). **Sur un nouveau milieu pour le montage des préparations microscopiques non colorées.**—*C. R. Soc. Biol.* 1923. Nov. 24. Vol. 89. No. 33. pp. 1065–1067.

The author finds an aqueous solution of sodium silicate (natrium silicium liquid. pur 1,400) a very useful medium for mounting unstained objects such as helminth eggs and arthropods. It is very cheap; will mix with water or caustic soda; hardens quickly without shrinkage; and is not affected by variations in temperature. Moreover, its refractive index is higher than that of Canada balsam, so that objects mounted in it are very well defined; another advantage is that old preparations can be cleaned off the slides merely by placing them in water. In mounting very delicate objects it is advisable to pass them through increasing strengths of the solution, and it is very necessary to avoid air-bubbles, as these are difficult to remove from preparations.

E. Hindle.

DSCHUNKOWSKY (E.). **Zur Frage der Aufbewahrung mikroskopischer Präparate.** [The Preservation of Microscopical Preparations.] —*Arch. f. Schiffs-u. Trop.-Hyg.* 1924. Jan. Vol. 28. No. 1. pp. 32–33. With 1 fig.

A simple method of preserving microscopical preparations, which should be of value on expeditions or in localities where it is necessary to protect slides against climatic changes.

The prepared slide is placed face upwards, and then covered with a clean dry slide so that the microscopical preparation is between the two slides. They are then placed on a thin layer of melted wax, in a thermostat or on a warm plate, and, owing to capillarity, the paraffin runs in between the edges of the two slides. Then the preparation is allowed to cool and subsequently dipped in melted paraffin, so that the two slides are coated with wax and the microscopical preparation between the two is protected against atmospheric or similar changes. When necessary, the two slides can easily be separated in order to examine the microscopical preparation.

E. H.

KLIEWE (H.). **Eine einfache und billige Methode der Spirochätenfärbung.** [A Simple and Cheap Method of staining Spirochaetes.] —*Muench. Med. Woch.* 1923. Dec. 14. Vol. 70. No. 50. p. 1486.

Films, fixed either by heat or in alcohol, are placed in a mordant consisting of a 0·5 to 1·0 per cent. aqueous solution of potassium permanganate for 1½ to 5 minutes, then washed in water and subsequently stained in a dilute solution of carbol-fuchsin (1 in 20) and finally washed in water and allowed to dry. Mouth and relapsing fever spirochaetes require 1½–3 minutes both in the mordant and in the stain; the syphilis spirochaete requires 3–5 minutes in the mordant (it is advisable to warm the solution gently), and the same time in the stain but without warming. With this method the spirochaetes are coloured light red and the background remains unstained, or takes only a faint rose colour.

E. H.

GILBERT (Ruth) & BARTELS (H. A.). **The Staining of *Treponema pallidum* in Dry Smears.**—*Jl. Lab. & Clin. Med.* 1924. Jan. Vol. 9. No. 4. pp. 273–275.

Of 12 simple stains tested for the examination of treponemata in dry smears, Fontana's method was found to give the highest percentage (64 per cent.) of positive results.

"1. Smears were air dried and fixed with Huge's fluid (1 cc. glacial acetic acid, 20 cc. formalin, and 100 cc. dist. H_2O) for one minute.

"2. They were next washed in water, then covered with mordant of 5 per cent. tannic acid in 1 per cent. carbolic acid solution, and heated until steam arose. The heated mordant was allowed to act thirty seconds.

"3. Smears were rinsed quickly in water, blotted and covered with a 2 per cent. ammoniacal silver nitrate solution.

"Heat was applied until steam arose and the heated stain was allowed to act thirty seconds.

"4. The specimens were finally washed, blotted and examined."

E. H.

GIEMSA (G.). **Zur Praxis der Giemsa-Färbung.** [Practical Directions for the Use of Giemsa's Stain.]—*Cent. f. Bakt.* I. Abt. Orig. 1924. Feb. 15. Vol. 91. No. 5. pp. 343–346. [6 refs.]

The author again calls attention to the necessity of an absolutely neutral medium in order to obtain successful results with Giemsa's stain, as the slightest trace of either acid or alkali interferes with the staining reaction. Distilled water usually contains carbon dioxide, which can be easily removed by boiling for a few minutes.

In addition it is necessary to employ a good quality of stain, and if pure glycerine is not available it is advisable to use the prepared solution in preference to the dry powder.

E. H.

NÖLLER (W.). **Eine halbtrockene Giemsa-Färbung für Darmflagellaten.** [A "Half-Dry" Giemsa Staining Method for Intestinal Flagellates.]—*Cent. f. Bakt.* I. Abt. Referate. 1924. Vol. 76. No. 9/10. pp. 239–240.

It is well known that intestinal flagellates cannot be satisfactorily stained by Giemsa's ordinary method, and wet films are difficult to prepare in the absence of laboratory accommodation. Consequently the following method will be of interest to workers in the field, as the author claims that it gives extremely good results with Trichomonas, Octomitus, Lamblia, and also with Sarcina and cultures of flagellates.

Ordinary films of the material to be examined are made on slides, fixed in either cold, or preferably warm, concentrated sublimate solution for 10–30 minutes, and then washed in gently running water for about 10 minutes. The slide is then removed from the water and allowed to drain, without letting the film dry, washed with physiological salt solution, and immersed in fresh, clear and sterile serum for about 5–15 minutes. The author employed horse serum, but probably any kind will serve. The slide is then taken out of the serum and allowed to dry, previously wiping off the serum from the back of the slide. When dry the film is fixed in absolute alcohol for 10–20 minutes, allowed to dry, and can then be stained in the same way as an ordinary blood film. The best results are obtained by staining with Giemsa for one hour or longer, rinsing the film in distilled

water and again dipping it into serum. This quickly removes any excess of stain; subsequently the films are allowed to dry and may be examined in cedar wood oil, or mounted in Canada balsam.

E. H.

TWORT (Frederick W.). **An Improved Neutral Red Light Green Double Stain, for staining Animal Parasites, Micro-Organisms and Tissues.** —*Jl. State Med.* 1924. Aug. Vol. 32. No. 8. pp. 351–355.

For this the author recommends the employment of Grübler's Lichtgrün F. S. and Grübler's Neutralroth—a half-saturated solution of each in distilled water. The neutral red solution is placed in a large open dish and sufficient light green solution added to combine with it. If both solutions are previously heated to 40°–50°C., the resulting precipitate forms in large masses and can be easily removed without using a filter. The neutralization point between the two solutions is shown by the darkening of the mixture, resulting from the presence of small quantities of both dyes in the solution.

The precipitate is rinsed in distilled water, dried at 37°C., and can then be kept indefinitely. It is soluble in methyl alcohol, preferably with the addition of 5 per cent. glycerine, or in a mixture of 60 per cent. ethyl alcohol and 40 per cent. distilled water. 2·5 per cent. of glycerine may be added to the latter solvent, but is not essential. In order to prepare the solution, the dye is mixed with a small quantity of sand and triturated in a mortar together with the solvent, pouring off the solution and repeating the process as each portion becomes saturated. It is essential to obtain a saturated solution. Finally, the solution is filtered and kept in a stoppered bottle, in which it will keep indefinitely. (It may be obtained ready made from Mr. George T. Gurr, 136, New King's Road, Fulham, London, S.W. 6).

For staining sections two parts of the solution are mixed with one part of distilled water, but these proportions may be varied according to requirements. Stain for 5 minutes, or longer, with the sections face downwards in order to prevent the slight precipitate in the solution settling on the slide. Then rinse in distilled water; dehydrate in absolute alcohol, which at the same time differentiates and also removes any precipitate; finally pass through xylol and mount in balsam, or Gurr's neutral mounting medium may be employed.

If desired to stain dried films it is best to fix them in absolute alcohol, then wash in xylol and afterwards again pass alcohol over the slide. The film is then rinsed in distilled water and stained in the usual way, but it is preferable to employ a stoppered jar and allow the staining process to continue for some time.

The stain is said to give very good results with all kinds of tissues, which should be fixed either in alcohol containing 30 per cent. glacial acetic, or in Muller's fluid containing 10 per cent. formalin. Properly stained sections show at least five colours. The nuclei appear purple red or violet, mucous and colloid degeneration a very bright red, while foetal cartilage and other tissues are orange-red; fibrous tissues, etc., stain a bluish-green colour, and red blood corpuscles a lighter grass green. Micro-organisms stain bright red to a dark purple-red or violet, and stand out in marked contrast to the green-staining connective tissue surrounding them. The internal structure of animal parasites is also well shown. The stain is very selective in its action and leaves all tissues sharply defined.

When the stain is held easily in solution, as when mixed with little or no water, the green dye stains the denser; but the addition of water tends to put the stain in a supersaturated state, with slight precipitation, and causes the red dye to stain the denser. A minute quantity of acid

increases the solubility of the dye, and alkali, such as ammonia, has the opposite effect.

[By attention to the simple directions for the use of Twort's stain very beautiful results can be obtained, especially with tissues, and it is a good stain to employ for the routine examination of pathological material.]

E. H.

MALE (A.). **Some Modifications of Staining Processes employed in Laboratory Work.**—*Jl. Roy. Army Med. Corps.* 1924. June. Vol. 42. No. 6. pp. 455–456.

The author first describes a method of counterstaining sections stained by Gram's method, which demonstrates both the nature of the tissue and also the presence of either "Gram-positive" or "Gram-negative" organisms. Two stock solutions are required, a 0·5 per cent. solution of neutral red in 50 per cent. alcohol and a 1·0 per cent. solution of light green in water. To prepare the counterstain the light green solution is diluted to 0·1 per cent. and then mixed with an equal quantity of the neutral red solution.

The method of use is as follows :—

Bring section to water, then stain in 0·5 per cent. aqueous methyl violet for 1–2 minutes. Add Gram's iodine for 1–2 minutes, then decolorize with alcohol and wash in water. Counterstain for 3–5 minutes ; wash in water ; dehydrate with alcohol ; clear in xylol and mount in the ordinary manner. In the resulting preparation Gram-positive organisms appear blue ; Gram-negative, red ; the nuclei, red ; and the cytoplasm, connective tissue, muscle and blood-cells various shades of green.

The second method is a substitute for van Gieson's picro-fuchsin, which has the objection that the details of nuclear structure are often destroyed.

The stock solutions are a saturated solution of martius yellow in 50 per cent. alcohol and a 1 per cent. aqueous solution of acid fuchsin. 4 parts of the former are mixed with 6 parts of the latter and the resulting mixture diluted 1 in 4 with distilled water.

The method of use is as follows :—

Bring the section to water ; stain with Ehrlich's haematoxylin 10 minutes ; wash in tap water for 10 minutes ; counterstain 3 to 5 minutes ; then wash in water ; differentiate and dehydrate with alcohol ; clear in xylol and mount.

E. H.

i. CLEARKIN (P. A.). **Hints on the Collecting and Forwarding of Specimens for Laboratory Examination.**—*Kenya Med. Jl.* 1924. May & June. Vol. 1. Nos. 2 & 3. pp. 39–45 ; 75–78.

ii. ——. **The Place of the Laboratory in Clinical Medicine.**—*Ibid.* July. No. 4. pp. 107–112.

i. Short notes on methods of collecting and preserving morbid tissues and fluids for pathological examination. It contains nothing new.

ii. A useful article on the interpretation of laboratory results, written with the object of helping medical practitioners. It contains nothing original.

E. H.

WARTHIN (Aldred Scott). **The Molasses Plate Method for the Staining of Many Paraffin Sections at One Time.** *Jl. Lab. & Clin. Med.* 1924. May. Vol. 9. No. 8. pp. 554–561. With 4 text figs.

An ingenious method whereby a large number of paraffin sections are held together in a celloidin sheet and stained at the same time. The original article should be consulted.

E. H.

LLOYD (R. B.) & CHANDRA (S. N.). **The Preparation of Permanent Stained Microscopical Specimens of Erythrocytes from Old Blood Stains.**—*Indian Med. Gaz.* 1924. Feb. Vol. 59. No. 2. pp. 81–82.

In medico-legal work it is often necessary to determine the nature of blood stains or clots that may be several months old. The authors find that by soaking in clear human serum for about one hour, with care to avoid evaporation, the clot becomes softened and can be transferred to a slide and stained in the ordinary way. With this technique it is possible at a glance to determine whether non-mammalian blood is present or not.

E. H.

HACKENTHAL (Hermann). **Eine modifizierte Schüffner'sche Blutfärbung.** [A Modification of Schüffner's Method of staining Blood.] —*Deut. Arch. f. Klin. Med.* 1923. Vol. 143. No. 5/6. pp. 276–286.

The author obtains better coloration of the leucocytes by employing staining methods other than the ordinary methylene blue of SCHÜFFNER's original technique. (It may be recalled that Schüffner's solution consists of NaCl 4 parts, borax 0·1, phenol 3, and distilled water 1,000 parts.)

In the author's first method, which is recommended for general use, 2 cc. of this solution are mixed with 1–2 drops of a saturated aqueous solution of methylene blue and 1 drop of a similar solution of dahlia. Then 0·1 cc. of the resulting liquid is mixed with 20 cmm. of the blood to be investigated, by means of a haemoglobinometer. Slides are then prepared in the ordinary way, care being taken to employ vaseline to prevent the blood drying up, as it is necessary to leave the preparations for 30–60 minutes to allow the stain to act.

Particulars are given of the appearance of the various blood cells, and the author gives the normal relation of the leucocytes as follows: polynuclears 56–62; lymphocytes 27–32; large mononuclears 6–8; eosinophiles 1–3; basophiles and myelocytes 0–1 per cent.

To determine whether the leucocytes are acido-, neutro-, or basophile, 20 cmm. of blood is mixed with 0·1 cc. of the following staining solution:—1 cc. Schüffner, 4–5 drops of ripened methylene blue solution and 20 cmm. of HCl. The blood is then examined in the ordinary way.

Instead of methylene blue, thionin may be employed. 15 drops of a saturated aqueous solution are added to 1 cc. of Schüffner and the mixture filtered immediately before use. The subsequent technique is the same as that described above. Although useful for the small lymphocytes, this colour is not so reliable as methylene blue, as it produces degeneration of the leucocytes after a few hours.

A solution of thionin may also be added to an acid methylene blue preparation in order to accentuate differences in the staining reactions of the cells.

E. H.

DOLD (H.). **Ein neues Verfahren zur Konservierung (Ueberlebenderhaltung) von Blutzellen (Leukocyten, Erythrocyten, Blutplättchen) und anderen Körperzellen.** [A New Method of keeping alive Blood and Other Body-Cells in vitro.]—*Klin. Woch.* 1924. Apr. 8. Vol. 3. No. 15. pp. 629–630.

The author has examined a number of fluids with the object of determining the best method of keeping blood elements and other body cells *in vitro*, and finds that ordinary serum is by far the best. The other fluids tested are arranged in descending order as follows:—citrate plasma; Ringer; thyroid solution; normosal; serum filtrate (filtered through collodion); and physiological salt solution, which was by far the worst.

The serum may be inactivated by heating to 56°C. for 30 minutes and is then kept sterile at a temperature of about 5°C. Leucocytes will keep their form for 8 to 9 days in this medium, and in one case well preserved cells were observed after 100 days. Blood platelets lasted for 2 or 3 days and were recognizable after 30 days, and other cells, such as spleen cells, spermatozoa, etc., all preserved their form and staining properties much longer in serum than in any other liquid.

E. H.

MASON (Edward C.) & SANDFORD (Arthur H.). **A Proposed Buffered Physiologic Salt Solution to be used in Serology.** *Jl. Lab. & Clin. Med.* 1924. Feb. Vol. 9. No. 5. pp. 313–316. [2 refs.]

The authors recommend the use of a buffered physiological salt solution for all serological work and propose one with the following composition:—7 gm. sodium chloride; 1·7 gm. of secondary sodium phosphate (with 2 molecules of water); and 0·2 gm. of primary potassium phosphate in each litre of double distilled water. This combination gives a solution with pH of 7·4 to 7·8 with a salt concentration of 0·89 per cent. and is stated to give uniform and constant results.

E. H.

ÉMILE-WEIL (P.) & LAMY (M.). **Sur une cause d'erreur dans la détermination des groupes sanguins due au vieillissement des sérums-étalons.** *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1924. June 19. Year 40. 3rd Ser. Vol. 48. No. 21. pp. 859–861.

Attention is called to the danger in transfusion of using standard sera that have been preserved for any length of time, as the agglutinating properties gradually alter. For example, serum belonging to Group 3, which should only agglutinate blood belonging to Groups 1 and 2, after being kept *in vitro* for two to four months agglutinated all four blood Groups. Similarly serum of Group 4 lost its property of agglutinating the blood cells belonging to Group 3.

It is important, therefore, in testing blood for transfusion purposes to employ serum that has been recently controlled, and the writers are of the opinion that this operation should not be carried out by the general practitioner, except in cases of emergency.

E. H.

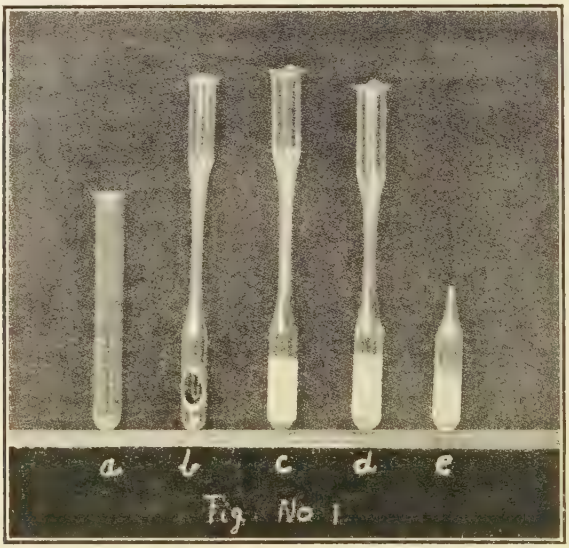
MALONE (R. H.). **A Simple Method of preparing Collodion Capsules for Use in the Study of Biological Problems.**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1227–1230. With 1 plate.

The author describes an ingenious method of preparing satisfactory collodion capsules which will stand autoclaving without loss of permeability. These have remained in the peritoneal cavity of rabbits for more than three months without any evidence of leakage.

"The technique is as follows:—

"(1). Take a test tube that will furnish the desired size of capsule; (the tubes used were miniature test tubes 7·5 cm. by 1 cm. (see Fig. 1a).

"(2). Heat the middle of the tube in the blow-pipe flame and draw out the glass so as to form a bulb, a neck, and a mouth (see Fig. 1b).



Simple method of preparing collodion capsules by employing a small test tube with a "window" covered by the collodion membrane.

[Reproduced from the *Indian Journal of Medical Research.*]

"(3). Heat the side of the bulb portion over a limited area with a small hot blow-pipe flame. When the glass is red-hot, suck on the mouth of the tube so as to produce a bubble of glass within the tube. This either bursts spontaneously or can be broken up, forming a small oval window (see Fig. 1b).

"(4). Close the window thus formed by rolling a strip of thin cigarette paper around the tube, fixing it on with thin collodion (1 or 2 per cent. collodion in a mixture of 75 parts ether and 25 parts absolute alcohol)—see Fig. 1c. In applying the collodion, avoid the portion of paper overlying the window.

" (5). Allow to dry in air, and then dip the test tube into 12 per cent. collodion up to the lower end of the drawn-out neck and withdraw it slowly.*

" (6). Allow excess collodion to drain off for 30 seconds, holding the tube . . . . in the ether-alcohol vapour above the surface of the collodion.

" (7). Dry in air for 1 minute.

" (8). Immerse in absolute alcohol for 5 minutes.

" (9). Wash off the alcohol in running water for a few minutes. The tube now appears as in Fig. 1d.

" (10). Immerse the empty test tube in water and test for leakage, gently applying pressure by means of a rubber teat attached to the open end.

" (11). Sterilization :

" Fill the prepared tube to the upper extremity of the drawn-out neck with peptone water. Place it in a larger test tube containing distilled water so that the level of the water in the outer tube is a little below the lower end of the neck of the inner tube. Plug both tubes with cotton wool and sterilise in the autoclave at 120°C. for 20 minutes.

" (12). After removal from the autoclave, examine the tubes and if there is no evidence of leakage, as shown by an alteration in the levels of the fluid, test the contents of the outer tube by the biuret test. A positive test indicates that the membrane is permeable.

" (13). The permeable tube may now be used for experiments in vitro by pipetting off the peptone water and replacing it with fluid, semi-solid or solid medium as desired.

" (14). If it is to be used for intra-peritoneal insertion, it is sown with the material under experiment, removed from the outer tube with sterile forceps and sealed in the flame (Fig. 1e)."

E. H.

CUNNINGHAM (J.) & TIMOTHY (B.). **A Comparison between the Numerical Content of Certain Bacterial Suspensions obtained by the Haemocytometer Method and Brown's Opacity Tubes.** — *Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1253–1258. [3 refs.]

The authors have prepared suspensions of all the commoner bacteria in varying concentrations so that they agreed with Brown's opacity tubes Nos. 1 to 10. The number of bacteria in each suspension was then counted by means of a haemocytometer. The results are given in tabular form and indicate the relation of opacity of various bacterial suspensions to the actual number of bacteria present.

E. H.

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* " The 12 per cent. collodion is prepared by dissolving 4 grams of dry necoloidin or Schering's celloidin in a mixture of 75 cc. ether and 25 cc. absolute alcohol, and evaporating down to one-third of the bulk.

" The dipping is carried out . . . . [in] a large test tube, 20 cm. by 4·5 cm., containing a sufficient quantity of the 12 per cent. collodion and closed by a bored rubber stopper. Through the hole in the stopper and moving freely in it is a glass rod, to the lower end of which is attached a small piece of rubber tubing, the glass rod and the tubing being large enough to fit snugly into the mouth of the test tube which is to be dipped, and serving as a handle.

" The tube is dipped once and withdrawn by a rotary movement of the handle. If this is carried out slowly and the tube as well as the collodion chilled in the ice-box beforehand, bubbles do not cling to the surface of the paper.

" During this dipping process the large test tube is kept tightly stoppered.

" When not in use, the collodion is kept in a tightly stoppered bottle in the ice-box to prevent evaporation."

NAPIER (L. E.). **The Preparation of N.N.N. Media of Different Hydrogen-Ion Concentrations.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 733–736. With 6 figs.

In the preparation of N.N.N. media it is not practicable to add acid or alkali to the agar before it is sterilized, and therefore it must be introduced at the same time as the blood is added.

A carefully measured quantity of blood is added to each tube of agar, and then the required amount of sterilized acid or alkali solution, and the medium well mixed by rotation. All glass used should be first boiled in weak hydrochloric acid and then washed in distilled water.

The hydrogen-ion concentration of the medium gradually increases (from pH 7·7 to pH 7·0) until about the eighth day, after which it is almost constant. Therefore, in order to obtain media of known pH, it is necessary to make calculations on media of this age, and the author gives a series of useful graphs showing the pH thus produced by the addition of various quantities of acid and alkali.

E. H.

DUFFAU (H. E.). **Une nouvelle technique d'hémoculture.**—*Arch. Inst. Pasteur d'Algérie.* 1923. Dec. Vol. 1. No. 4. pp. 704–708. With 1 text fig.

Employing large test-tubes, ordinary agar slopes are prepared and then 10 to 15 cc. of bile, bouillon, or peptone water is added to each tube, so that when the tube is vertical part of the agar is above the level of the liquid. Then about 2 cc. of the blood to be examined is added and the tube incubated at 37°C. for 20 hours. When the culture is positive the organism grows on the surface of the agar above the level of the liquid and can be identified in the usual manner. The author claims exceptional rapidity in diagnosis by the employment of this method.

E. H.

PUNTONI (Vittorio). **Un metodo per l'isolamento in coltura dei protozoi dalle infusioni fecali.** [Separation and Culture of Protozoa from Faeces.]—*Policlinico.* Sez. Prat. 1924. July 28. Vol. 31. No. 30. pp. 965–966. With 4 text figs. [1 ref.]

The author suggests the following method for isolating single protozoa from faecal suspensions. A slide, 2 cm. by 6–7 mm., is marked transversely with a diamond. It is then sterilized by flaming and a loopful of the suspension is placed on one half and a larger drop of suitable nutrient medium on the other. The two drops are joined by a fine line drawn with a sterile needle. As soon as a protozoon is seen by a low power of the microscope to cross the bridge the slide is broken across and the capture dropped into the appropriate medium "whereby a pure growth from a single cell is obtained."

H. Harold Scott.

MALONE (R. H.). **An Examination of the Factors concerned in Neufeld's Bile Solubility Test.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 867–876. [8 refs.]

——. **Degree of Bile Solubility as a Means of Differentiating Pathogenic from Non-Pathogenic Capsulated Diplococci.**—*Ibid.* pp. 877–881. [4 refs.]

i. The reliability of NEUFELD'S "bile solubility" test was investigated, employing 12 to 10 strains of capsulated diplococci obtained from the sputum of cases of lobar pneumonia and from the secretions of the naso-pharynx and tonsils of healthy throats. The author finds that the degree of solubility of the organisms is of great importance, and this can only be tested by performing the tests under uniform conditions.

The following suggestions are put forward and supported by tables of experimental results :—

"(1). Growths on solid media should be used in preference to those in fluid media and the organisms suspended in normal salt solution, thus ensuring that the suspension contains bacterial substance free from acid, extraneous protein, glucose, etc. The reacting fluid will then be alkaline on the addition of the solvent.

"(2). The solvent should be used in the same concentration for all tests, as the degree of solubility varies directly with the concentration of the solvent. Sodium taurocholate 1 in 10 has been found to be a satisfactory solvent.

"(3). The bacterial suspension must be kept constant as the degree of solubility varies inversely with the concentration of the bacterial suspension.

"(4). The temperature and time of the reaction should be kept constant. Half-an-hour in a water bath at 37°C. gives the best results.

"(5). The mixture of suspension and solvent should be alkaline.

"(6). A method of estimating the degree of solubility (*e.g.*, by means of opacity tubes) should be employed."

ii. Employing the bile solubility test the author tested various strains of Gram-positive diplococci by acting on them with 10 per cent. sodium taurocholate solution. Pathogenic strains tend to be either soluble or insoluble, whilst normal strains are intermediate in character, as shown by the following table :—

Degree of solubility (Opacity tube numbers).	Number of "normal" strains.	Number of pathogenic strains.
Less than 1 to 2	16	57
More than 2 to 3	4	10
,, ,, 3 to 4	0	1
,, ,, 4 to 5	1	0
,, ,, 5 to 6	5	0
,, ,, 6 to 7	1	0
,, ,, 7 to 8	8	0
,, ,, 8 to 9	20	10
,, ,, 9 to 10	3	8
	58	86

The pathogenic strains and members of Types I, II & III, tend to fall into the soluble group, while normal strains and organisms classified as Group IV. are to be found in both groups.

The results obtained by the author suggest that with careful attention to detail, and in the hands of an expert, the bile solubility

test may be of use in differentiating strains of diplococci. On the other hand, GLYNN and DIGBY* found that pneumococci from the same sample and of the same serological type may show differences in bile solubility.]

E. H.

CORNWALL (J. W.). **Changes caused by *B. typhosus* in the Reaction of Some Media.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 839–844. With 1 chart. [1 ref.]

After describing the changes caused by the growth of *B. typhosus* in various media, attention is called to the necessity of examining control tubes that have not been inoculated. Clarified milk medium does not seem to change on incubation, but in the case of peptone water, glucose-peptone water and rabbit serum, respectively, at 37°C. changes towards acidity may occur after the media have been sterilized.

E. H.

KNIGHTS (E. M.). **Shipping Patients' Serums Long Distances in the Tropics for the Wassermann Test.**—*Jl. Lab. & Clin. Med.* 1923. Nov. Vol. 9. No. 2. pp. 125–127. With 3 figs.

The author found that by the method he describes contaminating bacteria are killed, while the serum is kept secure from other contamination during transit and arrives at the central Laboratory ready for testing—even after a 10 days' journey at "Mail pouch temperature" —Panama Canal Zone.

The golden rule is—sterility.

(1), Draw blood with sterile syringe.
(2). Place blood in sterile test tube; slant and allow to clot.
(3). Break up clot with sterile glass rod.
(4). Centrifuge, or stand tube upright overnight (if possible in ice box).
(5). Sterile-pipette off clear serum, without disturbing the red cells, and place serum in sterile ampoule for inactivating.
(6). Inactivate in water bath at 55°C. for 30 minutes; keeping ampoule always upright and the water well over neck of ampoule.
(8). Remove ampoule after 30 minutes and allow to cool to room temperature, keeping ampoule always upright.
(9). Seal off ampoule in flame, taking care not to heat serum.

H. M. Hanschell.

KORTHOF (G.). **Het verzenden of bewaren van Sera voor de Wassermann-Reactie.** [The Expedition or Storing of Sera for the Wassermann Test.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 4. pp. 643–645.

The conclusion is :—

If there are less than four days between the time of collecting the specimen and the test, and the serum does not show signs of infection (smell of rotting, bacteria in a stained smear), the results may be relied on. In sera older than four days a positive result is unreliable. It is recommended to send whole blood and not serum as samples for the test, because repeated manipulations considerably increase the chances of infecting the sample.

W. J. Bais.

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* Medical Research Council, Special Report Series. No. 79. 1923.

ALTOUNYAN (E. H. R.). **Serum Diagnosis in Syria ; an Analysis of 2,868 Cases.**—*Lancet.* 1924. Jan. 12. pp. 73–76. [16 refs.]

(1). *Syphilis* : The author tested 1,783 serums by the Wassermann reaction (Rochester Row technique—presumably Harrison's method). He finds that while chronic malaria has no appreciable effect on the Wassermann reaction acute malaria does increase the anticomplementary power of serum giving "false" positives : non-malarial pyrexia has no effect on the Wassermann reaction.

227 cases were tested by Sigma reaction : (Dreyer Ward technique) ; one case, in this series, of leprosy gave a positive (2·6 units). He is of opinion that Sigma reaction is of as great diagnostic value as Wassermann reaction ; in the study of syphilitics undergoing treatment Sigma reaction is the method of choice ; both Sigma reaction and Wassermann reaction should be used for the diagnosis of difficult cases. The possible influence on the Sigma reaction of malaria, leprosy and yaws requires investigation.

(2). *Tubercle.* C. F. T. Besredka Antigen ; 501 cases. Cross-fixation phenomenon with syphilitic serums proved a serious factor in all tests, and four positives occurred in the course of typhus, typhoid, smallpox and "sleeping sickness" hyperpyrexia. On the whole, the author thinks, one is likely to get a strong reaction in an incipient case and a weak or negative reaction in a terminal case wherever the focus of the disease ; exceptions to this rule are, however, many.

(3). *Chronic Bacillary dysentery.* 181 cases. Standard agglutination tests with Shiga-Flexner group may be useful in determining the prevailing type of infection in the dysenteries of any given population.

(4). *Typhoid.* 107 cases. Where, as in Syria, typhoid is endemic, single agglutination tests are of value in diagnosis after the eighth day. Agglutination tests for the enteric group should be made with as many organisms of that group as possible.

(5). *Typhus.* Of 57 typhus patients examined by Weil-Felix Reaction (B. Proteus X 19) three proved negative ; one of these on the tenth day became positive. The earliest day on which the reaction was obtained was the fifth, the latest four weeks from onset. The highest effective dilution was 1 : 5,000, the lowest 1 : 50.

In this interesting paper Dr. Altounyan describes his careful technique and gives for each group of diseases his results in tabular form.

H. M. Hanschell.

KIRSCHNER (L.). **Over het verduurzamen van Bacteriën en van het Rabies-Virus-fixe.** [On the Conservation of Bacteria and of Rabies-Virus-Fixe.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 2. pp. 193–204. With 1 text fig. [38 refs.]

By freezing and consecutive quick drying SWIFT (*Journ. of Exp. Med.* 1921, Vol. 33, 1) succeeded in bringing bacteria to a dormant state in which their virulence was preserved for years at room temperature. Kirschner modified SWIFT's apparatus (for the description of the instrument the original paper should be consulted), and describes the results of his experiments on this subject, especially in view of micro-organisms which are difficult objects of regular cultivation (pneumococcus, meningococcus, gonococcus). The cultures by this procedure change into a dry powder. After 2–5 months at room temperature in sealed tubes transfer the cultures to a suitable medium proved

their viability. The virulence of rabies virus fixe preserved during 16 months in this manner had not decreased. Freezing or desiccation alone did not show any preserving influence. The author compares the dormant state of bacteria and the winter sleep of higher animals. He states that this method of preservation is of much importance for keeping micro-organisms in the tropics, especially rabies virus fixe and vaccine lymph. [On the latter, however, no experiments are mentioned in his article.]

W. J. Bais.

LABORATORY REPORTS.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE. 1923 Dec. 13 & 1924 Jan. 17. Vol. 17. Nos. 6 & 7. pp. 337–345. **Laboratory Meeting.**

Ibid.—1924. Mar. 20 & May 15. Vol. 18. Nos. 1 & 2. pp. 1–12. With 2 charts & 5 figs.—**Laboratory Meeting.**

Many of the exhibits at the December meeting have been more fully described elsewhere, and therefore it is unnecessary to refer to them. Dr. BROUGHTON-ALCOCK demonstrated films prepared from a catarrhal exudate from an antrum, which contained numerous spirochaetes and rare Gram-positive diplococci. The spirochaetes resemble *Spirochaeta buccalis*, and although these organisms have been observed by Ruth TUNNICLIFF in a frontal sinus, and have been considered as the causal agent in a few cases of rhinitis, this is the first record of their discovery in the antrum. Dr. CASTELLANI exhibited specimens of dermatitis decalvans cryptococcica, showing the presence of a staphylococcus, a fungus, and a cryptococcus. The fungus is believed to be the cause of the condition, as staphylococcus vaccine has no effect, whilst potassium iodide in full doses has a very beneficial effect. Pruritus ani of mycotic origin was demonstrated, the fungi found belonging to the epidermophyton and trichophyton observed in dhobie's itch.

Colonel JAMES exhibited specimens of parasites of inoculated malaria in England (in general paralytic patients) that had passed through 20 human hosts by direct inoculation. No morphological changes were observed although the virulence of the strain (benign tertian) seems to have been increased.

Professor LEIPER showed specimens of Sparganum obtained from a mongoose. One other fed to a cat developed into a Diphyllobothrium, eggs of which were passed in the faeces. It is suggested that Sparaganum may be a normal phase in the development of certain species of Diphyllobothrium, which enters a mammal as the second intermediate host.

Dr. H. H. SCOTT exhibited a portion of the upper part of the intestine of a mouse, that had been fed with gravid segments of *Hymenolepis longior*, four days before being killed. Cysticercoids were seen in the villi. In another individual mature worms were found in the lower part of the intestine on the twentieth day after infection.

Dr. P. H. MANSON-BAHR showed specimens of living embryos of *Filaria bancrofti* and *Loa loa* stained in vivo with 1 in 1,000 watery methylene blue (Sharpe's method). The advantage of this method of distinguishing the embryos was very evident in the two examples.

Dr. NEWHAM exhibited a series of malaria slides from the Malay States showing, among other points, a film containing all three types of parasites in the same field ; also a red cell containing two sporulating

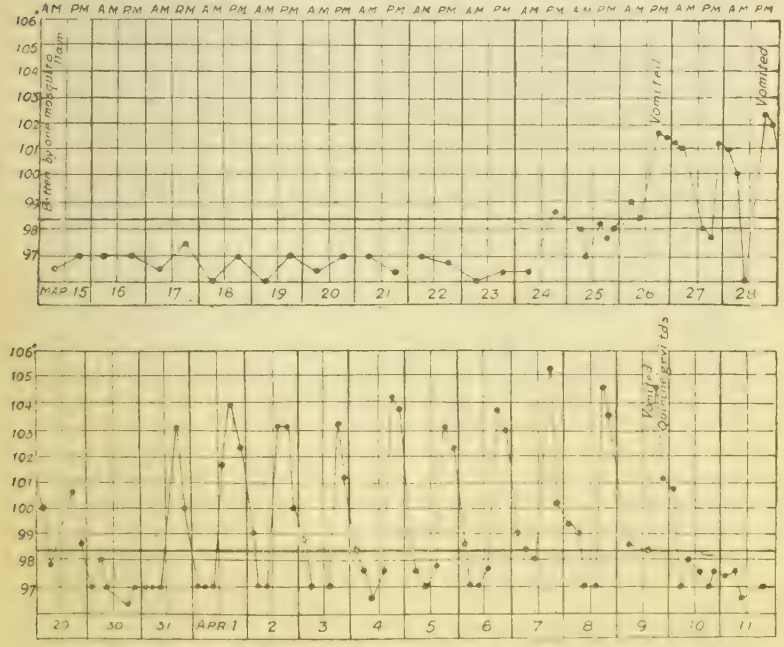
subtertian parasites and another with a sporulating subtertian and one slightly less developed.

Wing-Cdr. WHITTINGHAM gave a table illustrating the differences between the three common species of *Phlebotomus* occurring in Malta, viz., *P. papatasii*, *P. perniciosus* and *P. minutus*, and stated that the first species is most common in open country, while the two latter are more prevalent in towns, etc.

Dr. H. M. WOODCOCK exhibited films of Rickettsia-bodies from normal lice and considers that these bodies are produced from pigment-grains when the latter happen to come under the influence of the auto-cytolytic action of desquamated cells which are breaking down in the lumen of the gut.

At the March meeting Dr. BROUGHTON-ALCOCK described the progress under treatment of a case of chronic macro-glossia, or pseudo-elephantiasis of the tongue, of mycotic origin. This case was described in the Transactions of the Society, Vol. xvii, Nos. 1 & 2, p. 5, and in the course of the past year continued progress has resulted from treatment (by Dr. CASTELLANI) with large doses of potassium iodide, and a vaccine and filtrate of a cryptococcus.

Colonel JAMES showed further specimens and charts illustrating naturally infected malaria in cases of general paralysis in England. In a memorandum it is recorded that in some instances the malaria induced by direct inoculation of blood is of a very severe type, with a



Temperature Chart of an infantile general paralysis patient (aged 13) bitten on March 15th by one *A. maculipennis* infected with a pure benign tertian strain which caused a quotidian type of fever.

[Reproduced from charts in *Trans. Roy. Soc. Trop. Med. & Hyg.*]

tendency to fatality, and this is believed to be a result of passing the parasite directly through many human hosts. When this strain was transmitted by means of its insect host there was no loss of virulence, but if anything the change was an increase rather than a diminution. The accompanying chart shows the course of the temperature of a boy aged 13, suffering from general paralysis, who was infected with benign tertian by the bite of one mosquito (*A. maculipennis*). It will be noticed that the type of fever is quotidian, although this was known to be a pure benign tertian strain of malaria. If a high temperature is desirable as a spirochaeticide, this strain is probably the most effective yet obtained.

Major S. ELLIOTT gave a comparison of various indicators for the presence of free chlorine in the sterilization of water supplies. Either barium or cadmium iodide mixed with starch, as in the preparation of the ordinary zinc iodide and starch solution, gave an indicator equally sensitive but with the advantage of being permanent. Both have withstood over three months incubation at 37° C. Ortho-toluidine, although more sensitive, is difficult for unskilled persons to use, as it gives a yellow colour which is difficult to detect, especially in waters naturally tinted yellow. Aniline hydrochloride gives an intense purple colour with free chlorine, but is much less sensitive than the above-mentioned indicators.

Major MANIFOLD described a case of human sarcosporidiosis (See this *Bulletin*, this number.)

Lt.-Col. MARRIAN PERRY exhibited a case of extensive ulceration of the skin associated with a diphtheroid bacillus, which developed eighteen months previously after an operation for appendicitis. The isolated bacillus morphologically resembled that found to be the cause of the "desert" or "veldt" sores common in Egypt and Palestine during the war. It is agglutinated by the patient's serum and treatment by an autogenous vaccine produced beneficial results.

Dr. J. G. THOMSON showed a series of six blood films illustrating the malignant tertian parasite in the blood of malarial and blackwater fever cases in Rhodesia, and their cultivation. Eighteen to twenty hours after schizogony the infected corpuscles have a well marked altered staining reaction, indicating a chemical change, and in addition pernicious stippling appears. These altered red cells, acting as antigen, are supposed to be capable of producing haemolytic amboceptor, which will be specific to corpuscles so altered and not to healthy cells. After repeated attacks of malignant tertian the accumulation of these toxic substances finally result in haemoglobinuria. The cultures of *P. falciparum* showed the tendency of these parasites to clump round mononuclears.

Drs. WENYON and BROUGHTON ALCOCK describe, with figures, a Trepomonas, *T. agilis*, found coprozoic in a sample of mucus from a case of colitis. This is the first occasion on which this flagellate has been found in association with man.

Dr. WILLMORE exhibited sections of the intestine of a case showing a lymphosarcomatous growth, infiltrating the mucous and submucous layers. This patient presented symptoms closely resembling sprue, owing to the destruction of the absorptive surface of the ileum.

Mr. SAUNDERS showed photographs of *Aechmea* and *Vriesia*, two Brazilian Bromeliads which contain water and serve as the breeding places of numerous species of mosquitoes. In addition, stages of *Culicoides* (*Ceratopogon*) *varius* were shown. This is the minute

British blood-sucking midge which breeds in well rotted manure piles and in the flowing sap of wounded trees; there are several broods a year and they are especially troublesome in the spring, when the overwintering larvae transform into adults.

Mr. I. M. PURI showed specimens of *Simulium* reared by him in a specially constructed aquarium containing a very abundant air supply.

Dr. Andrew BALFOUR exhibited a cinematograph film illustrating the etiology, spread and prevention of malaria which had been prepared by the International Health Board of the Rockefeller Foundation. The first part of the film dealt with the effects of the disease and the method of infection; the second, with preventive work; and the third, with the results of antimalarial work. The educative value of such a film is very great, and it should be of considerable assistance for purposes of propaganda in countries where the inhabitants do not realize the importance of malaria in its effects on the economic welfare of the community.

E. H.

MANSON-BAHR (Philip). **On Laboratory Diagnosis in the Tropics and Sub-Tropics in War Time.**—*Jl. Roy. Army Med. Corps.* 1923. Nov. & Dec. Vol. 41. Nos. 5 & 6. pp. 321–333; 416–431. With 2 figs., 1 map & 3 charts.

This valuable article is based mainly on the author's experience, gained during the late war, in the Mediterranean and Egyptian Expeditionary Forces. In this region the two main diseases were malaria and dysentery, and the aim, as far as possible, was to get "early and accurate primary diagnosis and early and efficient treatment."

The greater part of the paper is concerned with the application of this principle in the main units of the Army Medical Service and proposals for the institution and organisation of a Diagnosis Unit. These proposals do not lend themselves to abstraction, and those interested should consult the original article.

In connection with the bearing of medical diagnosis on the military situation, attention is called to the supreme importance of malaria in the Eastern theatres of war. The difficulty of diagnosing this disease from clinical symptoms, in the absence of any blood examination, is shown by the following list of examples from the author's experience:—

SUBTERTIAN MALARIA.

I.—*Cases with Cerebral Symptoms.*

Preliminary or Provisional Clinical Diagnosis.	*Corresponding Clinical Type of Subtertian Malaria.*
"Sun-stroke" or "Heat-stroke."	Comatose or delirious type with hyperpyrexia.
Mental deficiency or mania.	Maniacal type of cerebral malaria with suicidal tendencies.
Epilepsy.	Cerebral malaria with epileptiform convulsions.
Cerebrospinal meningitis.	Cerebral malaria with spinal symptoms.

II.—*Cases with Abdominal Symptoms.*

Dysentery.	Abdominal malaria with passage of blood in stools.
Cholera or paracholera.	Choleraic or algid form with subnormal temperature and collapse.
Intestinal obstruction.	Clinical condition produced by blockage of intestinal capillaries by sporulating subtertian parasites.
"Appendicitis."	Abdominal malaria with pain and tenderness in the right iliac fossa.

III.—*Cases with Icteric Symptoms and Pain over the Hepatic Area.*

Jaundice, infective jaundice, cholecystitis, etc.	Bilious remittent form of subtertian malaria with vomit of bile.

IV.—*Cases with Pulmonary Symptoms.*

Bronchitis, pneumonia and pleurisy.	Malarial pyrexia with superadded pulmonary congestion, and cardiac distress due to malarial myocarditis. Pleuritic pain over the left hypochondrium being possibly caused by congestion and rapid enlargement of the spleen.

V.—*Cases with Nephritic Symptoms.*

"Acute nephritis" or "nephritis."	Subtertian malaria with general anarsarca and the excretion of albumin and sometimes blood into the urine.
Haematuria.	Methaemoglobinuria or blackwater fever.

VI.—*Cases with Skin Lesions.*

Purpura "Measles."	Septicaemic type of subtertian malaria with multiple cutaneous haemorrhages. These cases are rare, but two were encountered.

VII.—*Cases of Average Severity.*

(*a*) "Influenza" or "rheumatism."	Malaria pyrexia with arthritic pains.
(*b*) "Enteric," "sandfly fever," "trench fever," "relapsing-fever."	Average cases with pyrexia. Enlargement of the spleen not necessarily detectable.

VIII.—(*Sequelae*).

Cachexia and anaemia diagnosed as "pernicious anaemia," "leucocythemia," "debility."	Splenomegaly and great anaemia due to blood destruction.

The more important diseases of the Egyptian Expeditionary Force requiring a rapid laboratory diagnosis and the methods employed in forward units are outlined below.

Malaria. Thin films were always employed, as with these it is easier to distinguish the different species of parasite than in thick films. The slides were marked by scratching with a needle on the film itself.

Leishman's stain was used and, in order to economize stain and water, the portion of the film to be stained was marked out with a grease pencil, so as to avoid covering the whole slide.

In all doubtful cases three separate blood examinations were made, after an appropriate interval of time between each.

Relapsing Fever. The spirochaetes are usually present in the early stages of the fever and are well shown in the ordinary films stained with Leishman. Occasionally, thick films were examined, dehaemoglobinized and stained with carbolfuchsin.

Bacillary Dysentery. If the exudate from the rectum contains numerous polymorphonuclear cells together with the refractile endothelial macrophages and *Entamoeba histolytica* is absent, the diagnosis of "probable bacillary dysentery" is justifiable. The method of cytological diagnosis employed and recommended is that described by WILLMORE and SHEARMAN (See this *Bulletin*, Vol. 12, p. 311).

Amoebic Dysentery. It is essential to examine a fairly fresh specimen as the entamoebae die out within a few hours. The discovery and recognition of *E. histolytica* is not always an easy matter, but the almost complete absence of polymorphonuclear cells combined with the presence of fragmentary remains of endothelial and other cells point to an amoebic infection.

Schistosomiasis. The diagnosis of both types is readily made by simple microscopic examination under a low power, when the characteristic ova either in the urine or faeces can be easily recognized.

Enteric Fever and Typhus Fever. The bacteriological diagnosis of these fevers cannot be undertaken by any forward diagnosis unit.

Cholera. The importance of an early recognition of this disease is such that all diagnosis units should undertake the work. DAVIES' method was employed (*Jl. Roy. Army Med. Corps.* 1920. Vol. 35. p. 329), which consists in agglutinating the bacillus, in primary culture in alkaline peptone water, with specific anticholera serum, upon a Garrow's agglutinometer. With this method the cholera vibrio could be recognized in 24 to 36 hours.

Diphtheria. Although very important, it is doubtful whether this can be undertaken by a forward diagnosis unit. It was found difficult to prepare good Loeffler's serum in the field; camel's serum was found to be satisfactory, but difficult to obtain. The preparation of this medium should be the duty of a base laboratory which can supply the field laboratories, and the latter can then perform the diagnosis.

E. H.

MADRAS. **Report on the Working of the King Institute of Preventive Medicine, Guindy, for the Year 1922-23.** (With Appendices) [CUNNINGHAM (J.). Director.]—pp. 58+2. With 4 charts. 1924. Madras; Supt. Govt. Press. [Price 1 rupee 12 annas.]

The first part of this valuable report is concerned mainly with matter of local interest, in the course of which the Director advocates the formation of permanent "investigation units" which should be attached to the Central Institute and be available at short notice for the investigation of any outbreaks of disease throughout the Presidency. Four units are proposed, one each for bacteriology, protozoology and malaria, entomology, and helminthology, respectively. Each unit must posesss extreme mobility and should be able to move off from the Institute

with all necessary apparatus and stores within 24 hours of receipt of orders. Any media, stains, etc., can be prepared at the Central Institute and supplied to the units as required. Six of these units were sent out from the King Institute during the year under report, and the results were so satisfactory that the general adoption of this organization is strongly recommended.

Vaccine. 2,079,915 cases of vaccine lymph were issued during the year, of which returns for 61·1 per cent were received. "The results obtained with glycerine lymph are without exception superior to those obtained with lanoline lymph." The two kinds were tested by vaccinating 8,172 children, the majority being vaccinated with lanoline lymph on the right arm and glycerine lymph on the left. The results are given in tabular form :—

	Case percentage success.	Insertion percentage success.
Glycerine lymph ...	90·9	84·5
Lanoline lymph	68·5	53·3

Attempts were made to purify glycerinated lymph with chloroform, but the results at present are inconclusive.

Examination of specimens. A special feature of this year has been the large number of specimens received for the diagnosis of relapsing fever, owing to the occurrence of a widespread epidemic throughout the Madras Presidency.

Research Work. Experiments with "Stabilised Bleach"* gave very satisfactory results, as this preparation retains its percentage of available chlorine over long periods of time ; no appreciable difference was observed after 5 months' storage. When stored in glass containers, the results were better than when the bleach was put up in zinc tins.

Numerous experiments on the rapid filtration of water through sand filters, carried out at Guindy during the years 1921–23, are reported in an Appendix. The results indicate that continuous and rapid filtration, through sand filters, at the rate of 8 inches or at the most 12 inches vertical per hour is the best and most economical way of using such filters as a preliminary to chlorination.

Appendix No. 2 contains a report [by J. H. THEODORE, I.M.D.] on the working of a camp laboratory at Alipuram Jail, Bellary, where bowel complaints, especially dysentery, had shown a tendency to increase. When the laboratory was installed there were 385 cases in hospital out of 4,400 prisoners. The stools of the entire jail population were examined during 12 days in order to detect any one suffering from latent dysentery ; all such cases were isolated and formed into a so-called "bowel gang." The result was a marked reduction in the total number of cases of dysentery in the jail, and also those that did occur were almost exclusively derived from amongst the members of the bowel gang.

An examination of 600 stools, taken at random, showed that 93·5 per cent. were infected with Ancylostoma, so the entire jail was treated, with very beneficial results as regards the general improvement in health of the convicts.

Appendix No. 3 [by Civil Assistant Surgeon RAMAKRISHNAN] comprises a report on relapsing fever in the Tanjore District, where an epidemic appeared in September 1921, and was very severe in January, February and March 1922. The epidemic was entirely restricted to the

* Prepared by the United Alkali Co., Ltd., England.

lowest classes of the community, among whom *Pediculus capitis* was present in almost every case, though *P. corporis* was not found. The mortality of the epidemic varied from 15·09 to 95 per cent., and out of 2,716 cases there were 1,415 deaths. The records of the number attacked, however, were not accurate.

As regards the clinical features, the majority of the cases showed one relapse, a few did not show any relapse, and a second relapse was never observed. The spirochaetes as a rule seem to appear in the blood on the second day of the onset of febrile symptoms and are found in fairly large numbers during the third, fourth and fifth days of the fever, after which they begin to disappear from the circulation. Mice and a monkey were infected by subcutaneous inoculation of infected blood.

Attempts were made to infect monkeys by means of head lice removed from patients suffering from the disease, but no positive results were obtained.

E. H.

CEYLON. **Administration Report for 1922. Report of the Director, Government Pasteur and Bacteriological Institutes for the Year 1922.** [NICHOLLS (Lucius), Director.]—18 pp. [Received from the Colonial Office.]

Rabies. Up to the end of 1922, 1,441 persons had been treated and there had been 15 failures, a percentage of 1·04. Attention is called to the existence of patients suffering from "hysteria rabietica," whose symptoms often closely resemble those of rabies, especially if they have seen another person suffering from this disease. Such cases of hysteria are very difficult to diagnose, but when the patient has not seen another person with rabies his symptoms are bizarre, such as barking like a dog and trying to bite other people. The condition is easily cured by suggestion and is no doubt responsible for the belief that rabies is susceptible to faith healing.

Vaccines. Dried vaccines, prepared in various ways, have given excellent results in the treatment of many chronic infections, and the dosage is more accurate than by counting and estimating the number in a suspension. Experiments are described showing that bacterial antigens are able to withstand desiccation, boiling, the action of absolute alcohol, formaldehyde and ether without losing their properties of giving rise to immune bodies on injection into men or animals. Absolute alcohol has a detoxicating effect and enhances the antigenic value of bacterial proteins. Ether removes lipoids and waxes and allows the alcohol to act freely on the proteins. A comparison was made between Haffkine's plague vaccine and one prepared by precipitation with alcohol and formalin, desiccation and boiling. The latter was found to be more effective.

The author has used this method of preparing vaccines with a number of organisms and finds that the following doses are well borne and do not cause a severe reaction :—

"Staphylococcus aureus	1 cc. of 1 in 750
Streptococcus haemolyticus	½ cc. of 1 in 500
Streptococcus viridans	1 cc. of 1 in 250
Bacillus pestis	½ cc. of 1 in 100
Bacillus dysenteriae	1 cc. of 1 in 750
Bacillus typhosus	1 cc. of 1 in 500
Ducrey's bacillus	1 cc. of 1 in 500"

E. H.

KENYA. Colony and Protectorate of. **Annual Report of the Bacteriological Laboratory for the Year 1922.** Vol. XIII. [KAUNTZE (W. H.) Senior Bacteriologist.] pp. 133–201. With 2 charts. [No place or date of publication. Printed by Waterlow & Sons, Ltd., London.

The first part of the report is concerned with laboratory policy, and a section on vaccine lymph production. One case of generalized vaccinia is recorded which developed in an Indian child the fourteenth day after vaccination, an unusually long incubation period. Glycerinated lymph was found to be more satisfactory than lanolinated lymph; a comparison between the results of using the same strain of vaccine prepared in these two ways showed a higher percentage of success for primary vaccinations in the case of the former.

In the section dealing with routine examinations mention is made, respecting the differential leucocyte count, of the variation in results caused by differences in the method of counting. Finally NAPIER's method was adopted (see this *Bulletin*, Vol. 20, p. 425), namely, to count the whole length of the film about the centre line including both extremities. The marked variation in films taken from the same person at different intervals or even from different parts of the body (as noted by STEPHENS and others (see this *Bulletin*, Vol. 18, p. 286)) throws doubt on many of the conclusions, and it is remarked that the results accomplished with blood counts bore little relation to the labour expended.

The figures for malaria show a slight increase on those for the last year [which was exceptionally dry], and attention is called to the necessity of an entomological survey and an investigation of the types of mosquito carrying malaria.

Typhoid fever seems to be endemic. The cases occur at irregular intervals and in such sparse numbers that it is almost impossible to trace the source of infection. The diagnosis by agglutination tests is troublesome owing to the late stage at which agglutinins appear in the blood. The value of blood culture is shown by the fact that three out of the four cases in January gave positive results by this method.

A number of cases of amoebic dysentery were observed during the year, and "these patients all responded miraculously to a course of injections of emetine." Towards the end of the year an epidemic of bacillary dysentery broke out in the Native Hospital, Nairobi. An organism resembling *B. dysenteriae* (Shiga) was isolated, and by the issue of a polyvalent vaccine the disease was brought under control.

For the first time in the history of the country, the presence of undulant fever has been discovered, five cases having been observed during the year and diagnosed by the agglutination reaction.

The difficulty of obtaining a paraffin suitable for embedding, which will give good results under all climatic conditions, will be appreciated by all workers in the tropics. By mixing one part by weight of beeswax with five parts by weight of a mixture of hard and soft paraffin melting at 50°C., fusing them together and filtering, a medium is obtained with a melting point of 51°C.–53°C., which remains firm and tough at all temperatures.

Schistosomiasis occurs in many parts of the Colony, and in Nairobi usually affects the rectum. Planorbis containing fork-tailed cercariae were found in a canal close to the town, and in one case these were morphologically identical with those of *S. mansoni*, but an infection experiment with a guineapig gave negative results.

With regard to helminth infections, 605 stools were examined this year and the following results obtained :—

"Ova of Ancylostomidae were found in ..	70 cases	11·6 per cent.
Ova of Taenia saginata were found in ..	59 cases	9·8 per cent.
Ova of Trichiuris trichiura were found in ..	45 cases	7·4 per cent.
Ova of Ascaris lumbricoides were found in ..	33 cases	5·5 per cent.
Ova of Schistosoma mansoni were found in ..	10 cases	1·7 per cent.
Larvae of Strongyloides stercoralis were found in	9 cases	1·5 per cent.
Ova of Hymenolepis (sp ?) were found in ..	1 case	0·2 per cent."

A case of infection with *Sparganum mansoni* occurred in the previous year (1921) ; it was found in an abscess on the thigh of a Masai.

For the treatment of yaws sodium-potassium-bismuth-tartrate is now being employed instead of neosalvarsan or one of its derivatives. The Director of Chemical Research (V. H. KIRKHAM), in an appendix, gives full particulars of the method of preparation of the compound, which has been modified and simplified, and gives a substance containing 54·5 per cent. bismuth.

A number of experiments were made on the use of rat-poisons and poison baits, in order to find out the best methods of poisoning the common plague rat of East Africa, *Rattus rattus kijabius*. A summary of the results are given below :—

"1. Maize flour forms a more attractive basis for rat poison baits than either bajri or mtama.

"2. The attractiveness of a bait made of maize flour is not increased by the addition of jagoree, ghee, cheese, water in which fish has been boiled, or a mixture of equal parts of ox bile and amber oil.

"3. Barium carbonate (crude) will kill *Rattus rattus kijabius* in 1½ grain doses in thirty hours.

"4. The minimum lethal dose for rats of 'Common Sense Rat Exterminator' is 3 grains.

"5. Squill and ratinol are too distasteful to rats to be taken in lethal doses.

"6. Maize-flour baits containing barium carbonate are only slightly less attractive to rats than plain maize flour, whereas those containing 'Common Sense Rat Exterminator' are very much more distasteful.

"7. Ratinol is harmless to fowls in doses of 60 drops.

"8. The minimum lethal dose of barium carbonate for dogs is probably 2 grains per pound of body weight, for cats between 1 and 2 grains per pound of body weight, and for full grown fowls of average weight about 8 grains."

Rat viruses. Dr. P. H. Ross, the former Director of Laboratories, found that rat viruses imported from England apparently lost all virulence in transit. The Liverpool virus, both as a meat bait and as a liquid, and Danysz virus were tested, and found to be useless as pathogenic agents for rats, thus confirming Dr. Ross's statement. In view of these results it is suggested that it would be advisable to prohibit the import of rat viruses.

Experiments on the use of fumigation showed that sulphur dioxide is a much more efficient agent for killing both rats and fleas than formaldehyde.

The flea index for Nairobi rats was determined for the year, three rats being examined daily and a total of 3,105 fleas being obtained, giving an average of 2·7 fleas per rat. *Xenopsylla cheopis* numbered 1,862, *X. braziliensis* 974, and other species 269. Charts are given illustrating the incidence of the fleas throughout the year compared with the mean monthly temperature and the rainfall, but no important

deductions can be made, although the flea minima occurred in the wet months, April and November, and the flea maxima in January and June, which were dry.

E. H.

TANGANYIKA TERRITORY. **Report of the Dar-es-Salaam Laboratory, for the Year 1922.** [Butler (G. G.). pp. 179–203. With 3 charts. [Issued with the Annual Medical and Sanitary Report. Tanganyika Territory, 1922. Received from Crown Agents for the Colonies, June 10, 1924.]

The number of cases of malaria showed a considerable rise towards the end of the year, probably as a result of an influx of recruits to the K.A.R. The proportion of the various types of malaria among Europeans was as follows :—

Subtertian	85·5 per cent.
Benign Tertian	9·6 per cent.
Crescents	4·8 per cent.

and similar proportions occurred among the natives.

An interesting chart is given showing the malaria incidence throughout the year, compared with the humidity at 9 a.m. and the percentage distribution of adult Anophelines. The writer is of the opinion that the relative humidity at 8 p.m. would be of most value in this respect, for a European is usually attacked by mosquitoes between 6 p.m. and when he goes under a mosquito net. The curves show a distinct correlation between humidity at 9 a.m., the only figures available, and the malaria incidence.

Relapsing fever seems to be on the increase, a total of 31 cases compared with 10 in 1921.

An interesting herb was sent in from Morogoro, which possesses the power of stupefying and killing fish and is used as a fish-poison. Its active principle seems to be a saponin and not picrotoxin, which is the usual fish poison.

Dr. HOWARTH's interesting observations on the breeding of mosquitoes in coconut trees are reviewed elsewhere, and the importance of his statement that even the highest trees may serve as breeding places is obvious to all workers in districts where they occur.

The remainder of the report contains details of the treatment of leprosy by intravenous injections of chaulmoogra ethyl esters X and Y, the dosage employed going up to 2·5 cc. by this method and 4 cc. intramuscularly. The results are inconclusive, but the occurrence of yaws or syphilitic lesions in association with leprosy is so common amongst natives that before any other treatment is begun it is advisable to treat these affections, in order to eliminate confusing conditions.

E. H.

UGANDA PROTECTORATE. **Annual Report on the Bacteriological Department for the Year ended 31st December, 1923.** [DUKE (H. Lyndhurst), Bacteriologist.]—23 pp. With 1 map. 1924. Entebbe : Govt. Printer, Uganda.

The main interest of this report lies in Part III, which is concerned with trypanosomiasis investigations. The writer again calls attention to his observation that exposure of a strain of trypanosomes to prolonged

direct transmission leads to its loss of the power of cyclical development in the fly; at the same time the virulence of the parasite is increased. The antelope strain in which these changes have been traced has now been subjected to direct transmission for a period of more than three years. It has now completely lost the power of development in Glossina and at the same time its virulence in monkeys and guinea-pigs has greatly increased. Moreover, a morphological change has taken place, for the typical posterior-nuclear forms, which were present in the strain when first obtained from the antelope, have now disappeared.

The reclamation of the shores and islands of Lake Victoria is in progress and the number of settlers on the Sesse Islands on 31st August 1923 was 6,401; on Buvuma Island on 30th December 1923 was 3,852; and in the reclaimed areas of the mainland riparian zone about 1,000. Up to the present no cases of sleeping sickness have been recorded from either the Sesse Islands or reclaimed mainland, but three cases, possibly contracted in the lake area, have been reported to the Laboratory. All these, however, had resided in, or near, Jinja and may have been infected in the adjacent inland areas around the Mpologoma River.

Part IV of the report contains details of the preparation of plague vaccine; the dose of which has been fixed at 3,000 millions.

With regard to the routine examinations performed in the laboratory it is noteworthy that 91·1 per cent. of the native stools examined contained Ancylostoma eggs, and 17·7 per cent. the eggs of *Schistosoma mansoni*. In addition to the usual helminth infections, *Dibothriocephalus latus* was found on three occasions.

The investigation into the prevalence of *B. abortus* is being continued and the suggestion is put forward that this organism and *B. melitensis* may be related in the same way as *T. brucei* and *T. gambiense*, the former being dependent on ruminants, the latter on man as host. It may be that strains of *B. abortus* adapted to goats are pathogenic to man, but not otherwise.

E. H.

NIGERIA. **Annual Report on the Medical Research Institute for the Year 1922.** [CONNAL (A.). Director, Med. Res. Inst.]—40 pp. 1923. Lagos: Govt. Printer.

Half this report is occupied by studies of Calabar swellings and blackwater fever, which will be noticed in their appropriate places. The investigation of a case of intestinal coccidiosis was reported in this *Bulletin*, Vol. 20, p. 447.

Under "Entomological" it is noted that a female *Stegomyia fasciata* can produce fertile eggs during a period of 31 days, at which point the mosquito was accidentally killed, after the last opportunity of fertilization by the male.

In 136 stools from Europeans, *E. histolytica* was found 24 times with or without erythrocytes, and 6 times in cyst form; in 22 native stools, *E. histolytica* occurred 4 times, a similar percentage, but whereas these contained 4 varieties of worm eggs, none were seen in the Europeans.

A list is given of tumours examined but it is not stated whether they were all of native origin.

Dr. W. A. YOUNG reports on the Branch Clinical Laboratory, Colonial Hospital, Lagos, opened in February 1922. He notes that no case of bacillary dysentery was observed (*cf.* this *Bulletin*, Vol. 20, p. 509), and that the incidence of malaria among European officers was high.

Of 258 European bloods examined (films taken from all hospital entrants), 183 showed subtertian parasites. He attributes the high figure to (1) lack of scientific quinine prophylaxis, *e.g.*, limitation to 5 grains daily in all circumstances; (2) refusal of quinine; (3) imperfect absorption owing to gastric conditions induced sometimes by alcohol—he prefers liquid quinine before breakfast; (4) supposed detriment of quinine to the system, inducing a syndrome which in some cases at least is due to malarial infection rather than quinine.

In 779 stools examined 6 species of helminths were found, the commonest being *A. lumbricoides*, which "most certainly has a distinct detrimental effect on health." Of 216 European dysenteric stools, 64 were of typical amoebic dysentery, showing *E. histolytica*, 112 were negative, and 40 showed epithelial debris, blood and mucus; the 40 are regarded also as amoebic, but the suggestion is made later that some such cases are malarial; no dysenteric bacillus could be isolated. The tubercle bacillus was found in 34 natives. "Chronic tuberculosis as seen in the European hardly exists in the native as yet, the cases being clinically of an acute, often very acute, type and the sputum being crowded with T.B."

Of 108 autopsies 32 showed pneumonia and 21 generalized tuberculosis. In one case the condition seen was typical of yellow fever, but pus was found in a joint and pure cultures of staphylococcus were grown. Two livers showed nymphs of *Porocephalus armillatus*.

There follows a report on HARPER'S treatment at the leper asylum and on the yellow fever outbreak at Warri, October-November 1922, which, it appears, may have been Weil's disease.

A. G. B.

TUNIS. **Notice sur l'Institut Pasteur de Tunis.** 23 pp. With 1 plate. 1924. Mar. Tunis: Imprimerie J. Barlier & Cie., 4, rue Annibal.

The Pasteur Institute, Tunis, was founded in 1893 for the study of methods of improvement of "vinification," and in the following year there were added antirabic and vaccine sections and a laboratory of analyses. It was third in order of Pasteur Institutes, the second being that of Saigon. In 1903 it was reorganized, when the present Director, Dr. Ch. NICOLLE, took charge, and from this period its chief activity dates. An interesting account is given of the discoveries made. Experimental work on typhus had its origin here. In 1909 the disease was reproduced for the first time in animals and the louse was proved to be the transmitter. With this knowledge typhus was banished in 2 years from the town of Tunis where it had raged time out of mind, and the results in the world at large are well known. Here, too, the part played by the same insect in relapsing fever was revealed (1911), and it was shown that soiled fingers, scratching, rubbing of the eyes, and not the bite, were the means whereby infection is conveyed. There follows an account of work done on kala azar and oriental sore, trachoma, the experimental study of which was initiated here, undulant fever, and many parasitic infections. In the antirabic service 12,124 persons have been treated, with 28 deaths, or 0·24 per cent. Data are given of publications, teaching, scientific missions, personnel, the part played by the Institute in the war, and so forth.

The income amounts to 316,000 francs, more than half of which is due to the sale of its products, and we are told that though legacies and

gifts are invited for the maintenance of this beneficent institution, these do not exceed in 30 years the sum of 3,000 francs. The Institute is about to be rebuilt.

A. G. B.

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research for the Year 1922.** STANTON (A. T.). Director of Government Laboratories, F.M.S.].—pp. 28–36. *Supplement to the F.M.S. Government Gazette.* 1923. July 27. Kuala Lumpur: Govt. Press.

Malaria.—FLETCHER has investigated the action of quinine and other alkaloids of cinchona on malaria. Forty-two cases were treated with cinchona febrifuge (Bandoengsche Kininefabriek, Java) as effectively as with quinine sulphate; ten grains were given twice daily. In the same dosage the four crystallizable alkaloids, quinine, quinidine, cinchonine and cinchonidine "appeared to be of about equal value in causing the disappearance of malaria parasites." Of tasteless preparations of quinine euquinine was effective, quinine tannate and quinine carbonate worthless. The results of the enquiry by FLETCHER and VISVALINGAM into the intramuscular method of giving quinine have been considered elsewhere (see this *Bulletin*, Vol. 20, p. 970). They conclude that quinine should only be administered by this route for urgent reasons and the doctor should not delegate the duty to others.

More work has been done on melioidosis, which will be reported in a separate memoir. A case of natural infection in a wild rat has been found. The conclusions were reached that *B. whitmori* is serologically identical with a strain of *B. mallei* from Muktesar but differs from it in its motility and in its growth on laboratory media; two other strains of *B. mallei* were more and less closely related to it; that *B. whitmori* is a member of the *B. mallei* group of organisms, and melioidosis a form of glanders which primarily affects rodents.

The table reproduced gives the results of the examination of 1,030 cases from the dysentery wards at Kuala Lumpur classed according to nationality. The higher degree of infection among the Indians may be correlated with their poorer mode of life as compared with the Chinese.

INCIDENCE OF INTESTINAL PROTOZOA IN RELATION TO NATIONALITY.

Organism.	674 Indians (mostly Tamils).		356 Chinese.		4 Malays.
	No.	Per cent.	No.	Per cent.	No.
Entamoeba histolytica	128	19·1	20	5·6	1
B. Coli	74	11·0	6	1·7	—
? Amoebae	21	3·1	5	1·4	—
Endolimax nana	19	2·8	4	1·1	—
Iodamoeba butschlii	4	—	0	—	—
Giardia intestinalis	34	5·0	9	2·5	—
Trichomonas hominis	111	16·5	8	2·2	—
Chilomastix mesnili	24	3·6	2	—	—
Enteromonas hominis	33	4·9	3	—	—
Embadomonas intestinalis ..	0	—	1	—	—

A. G. B.

MISCELLANEOUS.

LISTER (Spencer). **The Use of Pneumococcal Vaccine.** [Discussion.]—*Proc. Transvaal Mine Med. Officers' Assoc.* 1924. Feb. & Mar. Vol. 3. Nos. 10 & 11. pp. 1–10 ; 1–9. With 2 charts.

This is a discussion of Sir Spencer Lister's paper on pneumococcal vaccine reviewed in this *Bulletin, ante* p. 462. The usual *a priori* objections against the inferiority of mass statistics compared with laboratory experiments, and, on the other hand, against the applicability to man of inferences based on laboratory experiments on animals, may be passed over.

Dr. GOW produced some interesting statistics from the Premier mine for the years 1908–1923, which are reproduced below. These show that in the first twelve months (1917) after the entire strength (5,751 individuals) had been inoculated 3 times with a 4,000 million dose of Lister's 3-strain pneumococcal vaccine the incidence-rate of pneumonia, which in previous years had ranged between 20·3 and 152 per thousand, fell to 4·5 per thousand of annual strength, and the death rate, which in previous years had ranged between 3·3 and 31·1 per thousand, fell to ·87 per thousand of annual strength. They further show that in the 5 years after 1918, when the 8-strain vaccine was introduced, the annual incidence rates of pneumonia per thousand were respectively 0·8, 0·6, 0·5, 0, and 1·8, and the corresponding death-rates were 0·2, 0·42, 0·5, 0, and ·92.

Dr. DONALDSON stated that the pneumonia death-rates for the years 1921–23 on the Crown mines [under pneumococcal vaccine] averaged 2·1 per thousand. He suggested that the fall in the death-rate at the Premier mine might be due to a considerable extent to the dismissal of tropical labour. Dr. IRVINE also thought that tropical natives were a "forcing-house" for pneumonia and that their removal was an important factor in the reduction of that disease.

Dr. ORENSTEIN quoted statistics from the Central Mining group that showed fluctuations of annual pneumonia-mortality between 12 and 4 per thousand in a force of 52 to 62 thousand natives when practically no vaccination was being done. He also made comparisons of groups of mines where vaccination was carried out with groups where vaccination was not practised, showing a higher mortality-rate from pneumonia in the former than in the latter. His final opinion was that the observed results of vaccination against pneumonia, as practised on the Central Mining group, had not unquestionably demonstrated its value.

Dr. BUTT had always been a supporter and Dr. FREW was a particularly enthusiastic adherent of pneumococcal vaccination. Dr. HERTSLET had had good results during 4 years, practising a single inoculation of 2 cc. (32 thousand millions). Dr. PRATT JOHNSON, who still criticized the mode of preparation of the vaccine, was at last satisfied that evidence was beginning to accumulate, of a kind that he considered satisfactory, in favour of pneumococcal vaccination.

Lister, in his replies to his various critics, allowed that removal of tropical natives had something to do with the reduction of death-rates from pneumonia. He stated that the figures of ORENSTEIN's unfavourable comparisons were not correct, and insisted that the correct figures (which he quoted) show a much lower pneumonia death-rate from mines where vaccination was practised than from mines where it was not.

The final outcome of the long discussion was a decision to recommend, optionally, instead of the present method of inoculation, two inoculations at an interval of between 6 and 12 days, the first dose to be equal to 8,000 millions, the second to 16 thousand millions.

PREMIER (TRANSVAAL) DIAMOND MINING COMPANY, LIMITED.

PNEUMONIA STATISTICS—1908–1923.

Year.	Compound Strength.	Cases of Pneumonia.	Case Incidence per 1,000 Compound Strength per Annum.	Deaths from Pneumonia.	Death Rate per 1,000 Compound Strength per Annum.
1908	7,935	*a* 483	73·1	*a* 93	15·6
1909	7,429	653	87·8	110	14·8
1910	11,348	1,637	144·3	315	27·8
1911	10,569	1,607	152·0	329	31·1
1912	13,368	882	66·0	255	19·1
1913	14,556	642	44·1	111	7·6
1914	13·085	*b* 199	20·3	*b* 32	3·3
1915	—	*c* —	—	*c* —	—
1916	2,464	*d* 186	100·7	*d* 21	11·4
1917	5,751	26	4·5	5	·87
1918	4,912	*e* 65	13·2	*e* 20	4·1
1919	5,063	4	·8	1	·2
1920	4·794	3	·6	2	·42
1921	2,018	1	·5	1	·5
1922	1,243	—	·0	—	·0
1923	2,162	4	1·8	2	·92

a. Figures for ten months.
b. Figures for nine months.
c. Mine closed August, 1914; re-opened January, 1916.
d. Figures for nine months.
e. 29 cases of Pneumonia. 15 deaths during epidemic of Influenza.

A. Alcock.

GAUTIER (M. A.). **Rapport de la commission des épidémies en Grèce.**—*Grèce Méd.* 1924. Jan.-Feb. Vol. 26. Nos. 1–2. pp. 1–26.

The Commission, instituted by the League of Nations, was constituted in November 1922, after the disasters to the Greeks in Asia Minor, as a precaution against the spread of disease by the refugees, of whom great numbers, mostly old people and women and children in uttermost misery, reached Greece. It was placed under a special Greek Minister, who at once conferred autonomy on the vaccination department, of which the author was General Secretary with a staff of 11 doctors and 59 students and vaccinators, subsequently increased by 20 to 35 vaccinators from the 2nd army corps. The personnel was concentrated at Athens, the Piraeus, and Salonica, detachments being sent occasionally to localities where epidemics were reported.

Vaccination against smallpox, cholera, and enteric was carried out generally, but against plague and dysentery only where epidemics actually supervened. Refugees objected to vaccination, particularly against enteric.

Observations on anti-typhoid vaccinations.—Vaccine in which the bacilli had been killed by addition of carbolic acid caused no after-trouble, whereas that in which they had been killed by heat (58° C.) caused considerable local reaction and fever. Several hundred thousand refugees were subcutaneously vaccinated, and although epidemics of

typhoid occurred among the neighbouring inhabitants in Athens and in the islands of Hydra and Spezzia, there were very few cases in the refugee camps and those for the most part among unvaccinated individuals.

Vaccination against smallpox.—When the Commission started work a considerable epidemic of smallpox was raging in refugee camps at the Piraeus and Athens and also among the resident population, vaccination having been very much neglected in Greece. Serious epidemics afterwards occurred at various places in the provinces, particularly in Epirus. More than 1¼ million vaccinations were done.

Vaccination against plague.—A small epidemic of bubonic plague occurred in the island of Syra and another at the Piraeus. More than 93,000 vaccinations are recorded in the statistical table, but the value of the vaccine prepared in Athens was doubtful.

Vaccination against dysentery.—Subcutaneous vaccination was not much employed and always occasioned a painful abscess; but about 30,600 buccal vaccinations were given, mostly with a liquid polyvalent vaccine (Shiga, Flexner, Strong, and Y) containing about 3½ thousand million bacilli per cc. This vaccine caused a little dizziness and nausea and sometimes a transient diarrhoea. The vaccinations were given in places where dysentery was endemic or epidemic, but no vaccinated person contracted the malady, and on one occasion when a severe epidemic (Flexner) broke out in a camp it ceased at once among the vaccinated though continuing among the unvaccinated. In short, the efficacy of the buccal vaccination was demonstrated to the author's satisfaction.

Buccal vaccination against typhoid.—In the month of May, 1,210 individuals at Athens and Salonica received Besredka bilivaccin *per os*; in the following summer and autumn (July-October) many cases of typhoid occurred in both those places, and numerous deaths, but not a single case among those who had been vaccinated in May. Again, at the village of Kakossalessi, in Attica, with a resident population of 1,400 and 40 families of summer visitors, and the one common supply of drinking water found to be badly contaminated with coli, numerous cases of typhoid occurred in July and the following months (probably about 200 cases up to September). In September 1,043 persons were vaccinated *per os*; 963 received a liquid vaccine made in Athens containing about 3 thousand million bacilli, 60 received Besredka bilivaccine, and 20 received Lumière entero-vaccine, the first two vaccines being given on an empty stomach on 3 successive days, the last on 7 successive days. The vaccinators stayed in the village from the 11th to the 22nd September, during which time 10 new cases occurred, only one of which was a vaccinated individual—who had been vaccinated only 7 days before his attack.

Vaccination against typhus.—During an epidemic 51 vaccinators and 37 doctors and hospital assistants consented to be inoculated, each with 1 cc. of serum obtained from the blood of patients in the acute stage of the disease. There was no reaction, and among the 88 persons so vaccinated only 2 were subsequently attacked, one of them with a fatal result, although all were constantly exposed to infection. It must be noted, however, that 13 vaccinators equally exposed but not vaccinated were not attacked.

Notwithstanding all the charitable assistance freely given and the specific protection afforded against formidable contagious diseases, and notwithstanding the incomparable mildness of the climate of

Greece, yet at the camps at Athens and the Piraeus, where about 117,588 people were accommodated, the number of deaths recorded during 13 months was 4,120, of which nearly one-fourth were infants and young children under 3 years, and nearly one-fourth adults over 50 years. At Salonica, where the number assembled was at first 100,000 but was gradually diminished as the refugees were drafted off to agricultural labour, so that the mean average population is given as 35,000, the number of deaths in 13 months was 4,095, of which 847 were children under 2 years, and 974 old people over 60 years. At Athens and the Piraeus the diseases chiefly responsible for the mortality were, in that order, dysentery and enteritis (889), respiratory (576), tuberculosis (432), smallpox (346), typhus (298); at Salonica they were, in that order, dysentery and enteritis (998), respiratory (648), malaria (573), tuberculosis (527).

A. Alcock.

SEYFARTH (C.). **Seuchen und Seuchenbekämpfung in Russland.**—*Ztschr. f. Klin. Med.* 1924. Vol. 100. No. 1/4. pp. 203–222. With 4 figs. [17 refs.]

This is the report of a Medical Relief Expedition to the famine districts of Russia, and the following is a summary of its calamitous items:—

Typhus.—Between 1918 and 1922 about ten million cases were officially recorded in the Soviet republics; probably, however, the actuality for the whole of Russia was from thirty to thirty-five million cases, with a mortality varying from 7 to 10 per cent. Novarsural and other preparations of mercury, by intravenous injection, sometimes had a marvellous effect when given as soon as the diagnosis was established—subject, of course, to the usual contra-indications for mercury.

Relapsing-fever.—This followed typhus, and though the official estimate for the whole of Russia, between 1918 and 1922, was only three million cases, the real number was probably between fifteen and twenty million. Bugs as well as lice were said to carry the infection. The mortality was heavy; in Petrograd it was known to be 8·1 per cent. in 1918 and 4·9 per cent. in 1919. Neosalvarsan generally had a good effect; in cases where treatment had been delayed it generally suppressed the relapse when given on the 4th or 5th day of the apyretic interval.

Mixed infection of Relapsing-fever and Paratyphoid.—It is not only to the want of drugs for treatment that the author ascribes a peculiar complication, or mixed infection, of these two diseases, particularly prevalent in 1920–21. These mixed cases ran a terribly severe course and the mortality was over 50 per cent. The principal symptoms were jaundice and diarrhoea. Post mortem the kidneys were found infiltrated with small yellow enteric-like lymphomata and the glomeruli showed a haemorrhagic inflammation; the spleen was enlarged and studded with infarcts often in a state of suppuration, the whole organ in some cases being destroyed; the liver was generally enlarged; the condition of the intestine ranged from acute haemorrhagic catarrh to severe croupous ulceration; and evidence of pyaemia might be found in heart-muscle, endocardium, meninges, and other organs. The bacillus responsible showed a serological behaviour between paratyphoid A and B. Most Russian observers considered the disease not to be bilious typhoid. The question of complication with Weil's disease was raised but not answered.

Simple enteric.—Paratyphoid B, independent of relapsing-fever, was also observed, particularly in Petrograd; but owing to the prevalence of typhoid in Petrograd before the war (1912–1914) it is probable that the population had become considerably immunized.

Cholera appeared in the spring of 1918, beginning in Astrakhan and spreading westwards, and also independently in Petrograd. Infection was spread mostly by railroad, and not by waterways. In a severe epidemic in the Ukraine, in 1921, 183,000 cases were recorded.

Dysentery was of comparatively small importance and confined to the large towns, particularly Petrograd; only a few scattered cases were amoebic.

Smallpox occurred chiefly in the northern provinces. In the state of Petrograd, in 1919 (the worst year), there were 5,658 cases. In 1920 vaccination was carried out in the Red army and as much as possible among the civilian population.

Bubonic plague.—Small active foci existed in the Far East, in south-east Russia, and along the borders of the Black Sea.

Malaria.—This, in all its forms, has become the widest-spread, severest, and most persistent disease in Russia; it is quite impossible to state the weight and incidence of the infection.

A. A.

Annales de Médecine et de Pharmacie Coloniales. Paris. 1923. Sept.-Oct.-Nov.-Dec. Vol. 21. [23 *sic.*] No. 3. pp. 345–355. [1 ref.]—**Le service médical dans les postes consulaires de Chine de 1921.**

The consular posts of this report are Yunnanfou, Mongtseu, Hoihow, and Canton, and the reports refer to 1921.

The number of patients treated in hospital at Yunnanfou was 542, of outpatients 55,543, of surgical operations 148. The number of vaccinations was 3,308, of which 2,883 were successful. During recent years diphtheria and scarlatina have been epidemic here, and are said between them to have smitten 95,000 persons and carried off 30,000, in a population of 250,000. The scarlatina was of a peculiarly virulent type, perhaps because it is here a new disease; it is known to have annihilated families of 7 to 11 children in a few days. Opium-smoking goes on, although strictly forbidden, and alcoholism increases although the price of liquor is about double what it used to be.

At Mongtseu 791 in-patients and 64,688 out-patients were treated, and the number of surgical operations was 567, of which 439 were eye cases. All these figures are said to be below the average on account of fractious native officialism. The number of vaccinations and re-vaccinations was 2,760, of which 915 were successful. The poppy is cultivated on a large scale and opium-smoking flourishes exceedingly. In the treatment of purulent conjunctivitis an eye-wash of 1 per cent. $KMnO_4$ was most efficacious.

At Hoihow 606 in-patients were treated, of which 170 were females and 66 accouchements, and 6,700 out-patients, and the number of surgical operations was 9. The number of vaccinations and revaccinations was 1,238; of primary vaccinations 81 per cent. were successful.

At Canton the number of in-patients treated was 1,426, of out-patients 6,112, of surgical operations 313. At the school of medicine here there were 60 students, of whom 13 were female.

A. A.

LEAGUE OF RED CROSS SOCIETIES. **First Conference of Oriental Red Cross Societies, Bangkok, November 29th-December 7th 1922. Proceedings.**—189 pp.

This Conference of Oriental Red Cross Societies held at Bangkok was attended by delegates from America (Philippines and China), Australia, Britain, China, France (Indo-China), India, Japan, Netherlands (East Indies), Siam, and Geneva, as well as by representatives of the League of Nations, Rockefeller International Health Board, British Colonial Office, and Council on Public Health Education in China. It passed resolutions declaring its conviction that the programme of the Federated Red Cross Societies formulated in Geneva in March 1922 is entirely feasible in the Oriental field, and it urged the Societies represented at the Conference to embark at once upon one or more of the three main activities of popular health instruction, public health, and nursing and Junior Red Cross, and also to form consultative National Health Councils to co-operate with other public health agencies. The Conference also decided to urge National Societies working in territories where the abuse of opium is prevalent to make instruction regarding the danger of such abuse one of their chief educational objects. The success of the Conference is taken as a happy augury and authentication for a scheme of similar regional conferences to include the whole world in its sweep.

A. A.

DELAMARE (G.). **Le fonctionnement de la Chaire de Médecine Exotique en 1923. [Faculté de Médecine de Constantinople.]**—16 pp. With 6 figs. 1924. Constantinople: Imp. Ahmed Ihsan & Cie.

This account of the various activities associated with the seemingly temporary chair of exotic medicine attached to the Haidar Pasha Hospital at Constantinople appears to be of a justificatory-frustrate-valedictory kind. At any rate the occupant of the chair seems to have carried on with limited resources some very useful work of a missionary nature in tropical medicine. In addition to lectures and demonstrations on the pathology, bacteriology, and clinical aspects of certain tropical diseases, abstracts of important memoirs were made and were published in the (apparently now defunct) *Bulletin Sanitaire de Constantinople.* Some original papers also were published, some of which have been noticed in this *Bulletin.*

A. A.

RIBOLLA (Romolo). **Contributo allo studio su alcuni fenomeni neuro-psichici nelle popolazioni tropicali.**— *Arch. Ital. Sci. Med. Colon.* Tripoli. 1923. Oct.-Nov.-Dec. Vol. 4. No. 10-11-12. pp. 239-248.

The author, in discussing the question of Latah, draws analogies and traces connexions between it and the old religious dances, fanaticism, revival enthusiasm, and hypnotism, and regards the condition as being due to "an incompleteness of psychical personality, with ready suggestibility, which diminishes the normal inhibitory powers and leads to the development of psychic automatism" in the more ignorant and impressionable Eastern races. [This seems to be rather a definition of the disease than an explanation of its aetiology.]

H. Harold Scott.

TAMALET (E. J. M. G.). **Les suites éloignées des affections des pays chauds et leur thérapeutique hydrominérale.**—*Arch. Méd. et Pharm. Milit.* 1924. Feb. Vol. 80. No. 2. pp. 95–122. [51 refs.]

This long paper is concerned entirely with Vichy. The author, a military surgeon, is stationed at the Military Hospital there, which contains 174 rooms for officers and 118 beds for N.C.O.'s and privates, and was founded in 1847 for the benefit of soldiers, especially those returning from Africa and the Colonies. The mode of action of the water is discussed and the treatment of various tropical diseases. It is noted that the type of malaria seen is quite different from the type of thirty years ago, when the majority of the deaths at the hospital were the result of malarial cachexia: these cases are now not seen. It is stated that the cure has a surprising effect on the visceral sequelae of malaria, and especially the hepatic lesions, but no specific effect on the parasite. The action on the general nutrition, digestion, liver, spleen and kidneys in this affection is discussed at length. The author recognizes an association between malaria on the one hand and diabetes and biliary calculus on the other. Next is discussed the "colonial liver," which is compounded of malaria, blackwater, amoebiasis, syphilis, alcoholism and alimentary intoxication, but emetine treatment does not receive mention. Of amoebiasis patients those with the intestinal infection are not benefited, but the hepatic cases improve; here again it does not appear that emetine is employed. The conduct of the cure is next discussed and lastly the reactions and contra-indications.

A. G. B.

FUSCO (Gennaro). **Tentativi di chemioterapia per via cutanea nella tripanosomiasi sperimentale, nella febbre ricorrente e nella sifilide** [Cutaneous Chemotherapy in Experimental Trypanosomiasis, in Relapsing Fever and in Syphilis.]—*Riforma Med.* 1924. Jan. 14. Vol. 40. No. 2. pp. 29–30.

The author states: "A single drop of a 1 in 10 solution of the trichloride of arsenic applied to the intact skin arrests the disease [*T. brucei* infection in guineapigs] with certainty, and the trypanosomes, even if in large numbers, disappear from the circulation in 24 hours." He also states that in 1919 application of arsenic trichloride in cases of relapsing fever among Austrian prisoners of war brought about rapid and decisive effects in the primary fever and in relapses. On secondary syphilitic manifestations similar results were obtained and mucous plaques rapidly disappeared.

H. Harold Scott.

HEYDON (G. M.) & MURPHY (T. W.). **The "Biochemical Index" in Natives of the Territory of New Guinea.**—*Med. Jl. Australia* 1924. Apr. 19. Year 11. Vol. 1. No. 16. (Supplement.) pp. 235–236. [6 refs.]

This paper records the results of blood-group investigation (by the method of Moss) of 753 Melanesians, all male and mostly adult, from the Territory of New Guinea, including the main island, the Solomon

and Admiralty Is. and New Ireland. The following are the figures obtained :—

Agglutinogens present : von Dungern & Hirschfeld's nomenclature.	Jansky's Classification.	Number of individuals.	Percentage.
O	Group I	404	53·7
A	,, II	202	26·8
B	,, III	123	16·3
AB	,, IV	24	3·2

The "biochemical index" (ratio of A's to B's ; *i.e.* sum of Groups II & IV÷sum of Groups III & IV) is 1·54.

The Hirschfelds (*Lancet* 1919, p. 675) classified the races they examined in 3 groups—a European type, index 2·5 to 4·5 ; an Intermediate type, index 1·3 to 1·8, which included Arabs, Turks, Russians and Jews (and also includes the S. African Bantu) ; and an Asio-African type, index 0·5 to 1·09, which included Malagasy, Senegalese, Annamese, and Indians (and also includes Filipinos and Chinese). In this classification these Melanesians would come in the intermediate type and would also approach the Malagasy (index 1·09) in the Asio-African type.

The authors draw attention to the interesting fact that the Australian aborigines, who differ greatly from Melanesians in anthropological characters, have a high biochemical index near the extreme "European" end of the scale.

A. A.

D'Anfreville de la Salle (L.). **La question des mulatres.**—*Presse Méd.* 1924. Feb. 27. Vol. 32. No. 17. (Supplément.) pp. 338–340.

The author, who lived for ten consecutive years in Senegal, describes the origin of the mulatto community there, about the end of the 18th century, from the union, under Nature's sanction, of European sojourners with native women. Later arrivals from Europe made temporary matrimonial contracts with mulatto women of the earlier generations, and in the latter half of the 19th century lawful marriage between Europeans and mulatto women became not infrequent. At that time the mulattos performed many useful functions in commerce and in the political administration, often occupied good and even honourable positions, and had a fair chance of becoming a class of some permanent consequence locally. But with the introduction of universal franchise (in 1881) the mulattos lost their headway ; in the author's opinion they had not grit enough to hold it, and now they seem to be, as a class, of little consequence. The author makes a statement which, if it can be confirmed, indicates that the progeny of mulatto with native African exhibits the operation of Mendelian segregation : he states that the oldest mulatto family of Senegal is represented at present by several branches, one of which is "almost absolutely white" while the others are light coffee-colour or "almost pure black." The author lays stress on the fact that there are among mulattos many men of individual worth, and that he is writing of the mulattos merely as a people of mixed white and black race born and bred in tropical Africa.

A. A.

FARAKER (Erskine). **Notes on a Year's Work (1923) at the U.F.C. Mission Hospital, Kalna, Burdwan District.**—*Indian Med. Gaz.* 1924. Apr. Vol. 59. No. 4. pp. 191–192.

At this hospital 9,000 cases received treatment, 360 as in-patients. Ninety cases of kala azar were treated within and 200 outside the hospital. Diagnosis was made in practically every case from clinical symptoms plus the aldehyde test. This test, however, was strongly positive in a case of actinomycosis of the lower ribs, one of empyema of the lung, and several of alcoholic cirrhosis of the liver. An in-patient, on the other hand, with low fever, who reacted negatively, died a week later with leishmania in the spleen. For malaria cinchona febrifuge in 15 grain daily doses had been the mainstay. The routine treatment for helminths is Ol. chenopodium m. 15 with carbon tetrachloride m. 45 in capsule at night and mag. sulph. in the morning; it has been effective.

A. G. B.

STEUDEL (E.). **Aus den Jahres-Medizinal-Berichten 1912/13 der tropischen deutschen Schutzgebiete.**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Vol. 28. No. 1. pp. 1–63.

The annual medical reports of the Tropical German Protectorates (East Africa, Cameroon, Togo, New Guinea, Samoa) were issued yearly in a bound volume up till 1910–11. At the outbreak of the War the 1912–13 reports were under revision. They are now issued in an abridged form, and can be consulted by the curious.

A. G. B.

BETTS (A. J. Vernon). **The Operation of Litholapaxy and its Limitations.**—*Indian Med. Gaz.* 1924. Apr. Vol. 59. No. 4. pp. 187–191.

An interesting and valuable paper by a surgeon with an extensive knowledge of the special subject dealt with. The author is of opinion that the technique and limitations of the operation of litholapaxy are not always sufficiently clearly understood, and that, in consequence, a cutting operation is sometimes resorted to when simple crushing, with its rapid convalescence, would be in every way preferable. He proceeds to indicate the type and make of lithotrite which in his practice has given the greatest satisfaction, and points out some common faults to be remembered and avoided in the selection and choice of this class of instrument. The evacuator preferred is one of the author's own design described in the *Indian Medical Gazette* of August 1911. It has the advantage of being extremely sensitive and is of simple construction.

When litholapaxy fails in cases of vesical calculus the author attributes the failure either to its performance in unsuitable cases or to the employment of unsuitable and bad lithotrites. He is insistent on the fact that the operation has its limitations. Simple litholapaxy is recommended in those cases only where the stone can be easily grasped. When the calculus is just too large or too hard to be readily grasped and crushed median perinaeal litholapaxy is held to be indicated, and

in all other cases supra-pubic lithotomy. Encysted vesical stones—in the author's experience extremely rare and "far more often imaginary than real"—of course call for the supra-pubic operation, while stones encysted in the prostatic urethra are best dealt with by median perinaeal lithotomy.

Clear and detailed accounts of the operative procedure both in simple and perinaeal litholapaxy are given. Among the points emphasized are the necessity of a good skilled anaesthetist, who will maintain complete relaxation of the abdominal wall throughout the operation, and the desirability of avoiding over-instrumentation.

With the larger lithotrites, "provided they are fitted with a wheel and not a lever," the fullest force that can be exerted with one hand may, if required, be employed in crushing, but with the smaller instruments when the amount of force called for appears to trespass on the limits of safety litholapaxy should be abandoned in favour of the cutting operation.

The paper concludes with a table which gives a record of 66 consecutive operations for vesical calculus by the author in the year 1923 without a death. 58 were ordinary litholapaxies, 3 median perinaeal litholapaxies, and 5 supra-pubic lithotomies. The average stay in hospital was less than four days—only 2·4 days if we exclude the supra-pubic cases.

Well deserving of perusal in the original by those interested. The author is to be congratulated upon results to the attainment of which practice, experience, patience and dexterity must all have contributed.]

J. J. Pratt.

McCarrison (Robert). **Effects of the Long-Continued Ingestion of Tyramine and Histamine.**—*Indian Jl. Med. Res.* 1924. Apr. Vol. 11. No. 4. pp. 1137–1156. With 3 plates & 4 charts. [1 ref.]

The subjects of experiment were pigeons and young rats. The following are the main results :—

Both amines retard and may even inhibit growth, tyramine more potently than histamine. Both cause a sharp fall in the respiratory rate during the first 35 days of ingestion by pigeons ; thereafter the rate tends to rise again, especially with histamine, but not to the initial standard. Tyramine tends slightly to increase body temperature in birds, histamine to depress it after a slight increase during the first month. Tyramine may possibly—if rarely—cause exophthalmos. Both amines reduce the size of the thymus, and tend to reduce (without affecting the histology) that of the thyroid, but appear not to affect the parathyroid. Histamine has a pronounced effect on the adrenal medulla of pigeons, but apparently little effect on that of young rats, though it causes an increase in size of the young rats' adrenal glands ; tyramine causes a less distinct enlargement of the adrenals in both pigeons and rats. Tyramine causes marked reduction in size of the spleen in pigeons and rats. Histamine causes marked reduction in weight of the heart in pigeons and rats. Both amines—especially histamine—tend to increase the weight of the lungs and to reduce the weight of the pancreas in young rats. Tyramine tends to increase the weight of the pancreas in pigeons. Both amines cause a reduction in weight of the kidneys in young rats. Both cause slight reduction in weight of the gastro-intestinal tract. Neither amine exercise any effect on the weight of the testicles. Neither exercise any effect on the weight of the liver in young rats, but in pigeons histamine appears to cause a reduction in weight of

the liver. Adult animals appear to become in time habituated to the ingestion of these amines; in young animals, however, the effects on growth persist after ingestion is discontinued.

A. A.

DE ALMEIDA (A. Ozorio). **Le métabolisme basal de l'homme tropical.**—*Jl. Physiol. et de Path. Gén.* 1924. Jan. Year 23. Vol. 22. No. 1. pp. 12–18. [8 refs.]

The author re-affirms his contention that the basal metabolism of tropical man is much lower than that of people who live in temperate climates. It has been already noted in these columns that EIJKMAN maintains that no such difference exists. EIJKMAN's results are now attributed to the fallacious method he employed, viz. :—the apparatus of Geppert and Zuntz. De Almeida states that analysis by the Geppert-Zuntz apparatus does not give the mean composition of expired air, but approaches near to that of alveolar air, and he indicates how the error should be corrected.

W. D. Halliburton.

EIJKMAN (C.). **Some Questions concerning the Influence of Tropical Climate on Man. An Advanced Lecture in Hygiene delivered under the Auspices of the University of London.**—*Lancet.* 1924. May 3. pp. 887–893.

This is (up to the present date) the last of the international exchanges of courtesy that have been in progress between the Universities of this country (especially of London) and those of Holland for some years, but it is by no means the least in importance. It is so full of interest that every word deserves careful reading, and a short notice, such as this must be, is quite inadequate. It is the widespread belief that tropical lands must of necessity be unhealthy, as is shown by the popular expression "the white man's grave." The gist of Professor Eijkman's lecture is that this is a fallacy. Not only are many of the tropical diseases capable of prevention or cure, but the increase of physiological knowledge should furnish colonists, if suitably chosen, with the means which they ought to take in adapting themselves to new conditions of life. No one denies or attempts to deny that the struggle for existence against the forces of nature is severer in hot climates, but the author shows in outline how acclimatization should be brought about. His first point treats of the so-called tropical anaemia, often incorrectly diagnosed by mere pallor of the countenance, and he italicizes his conclusion (after outlining the evidence) that *there exists no purely physiological anaemia of hot countries.* The question of basal metabolism is next dealt with, but in no polemical vein. There are differences in diet, but the total caloric value is about the same in the natives as in those who live in cooler zones; here the colonist might take a useful lesson from the inhabitants and lessen his protein intake. Among many other subjects the author shows that differences in sweating are not due to differences in the number of sweat glands. There is often a tendency for the European to do "everything as usual"; if he accommodates his practices to meet what is to him unusual there is no reason why he cannot fit himself to the climate, for the climate is an unalterable factor. Adaptation must consist in altering a number of one's habits, food, stimulants, clothing, exercise and so forth.

W. D. Halliburton.

SCHNEIDER (J.). **Effects of Altitude on Health and Longevity. (With Particular Reference to South Africa.)**—*Med. Jl. S. Africa.* 1924. Apr. & May. Vol. 19. Nos. 9 & 10. pp. 273–279; 321–332. With 1 map in text. [31 refs.]

This essay obtained the second place in a certain prize competition, and possesses high merit, showing evidence of industry and capacity of clear exposition. It is only of secondary importance to the student of tropical life, except that migration to higher or cooler grounds is particularly necessary to those who live near the coast in the tropics. The physiological means of adaptation to altitude (by change in blood and respiration) are well known and are admirably summarized. Naturally the reviewer cannot object to the physiological views which form so large a section of the essay, seeing they are taken mainly from his own text book with due acknowledgment. Similarly in its medical section the views are those of OSLER and other well-known writers who are quoted. Whenever the author ventures to interpolate remarks of his own in the account of his cases of heart disease and abnormal blood pressure, this is done with admirable modesty. There are a number of misprints which present no difficulty and are probably due to inexperience in reading proof-sheets, but one word puzzles. One reads "the condition of the blood pressure is most *innuent.*" Is the word in italics a new one?

W. D. Halliburton.

TANON & CAMBESSEDÈS. **A propos du traitement de la variole par le xylol.**—*Rev. Méd. et. Hyg. Trop.* 1924. Jan. Vol. 16. No. 1. pp. 15–18.

The authors write in praise of xylol for smallpox, which it appears was introduced in 1871, forgotten, and reintroduced in Russia in 1903, since which date it has been employed in Paris. It is given in wine, 60–120 drops daily, in 2 or 3 doses, till improvement or hyperpigmentation sets in. It should then be decreased by 20 drops till 10 is the daily total. For babies 10 drops is a sufficient dose; children take it in milk. The effect is threefold: the smell disappears, suppuration is checked, and cicatrization leaves little trace. The checking of suppuration saves many lives and the mortality is said to fall by more than half. The chief inconvenience is hyperpigmentation, which gradually disappears and would not be noticed in coloured people. The authors have treated several hundreds of cases and have no doubt of the great advantages of the use of xylol in smallpox.

A. G. B.

VAN HOOF (L.). **Vaccination spécifique de l'Alastrim. (Note préliminaire.)**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1924. Jan. Vol. 3. No. 3. pp. 377–379.

True variola seems to have disappeared from Stanley Pool since 1912, and after 1918 to have been replaced by an attenuated disease resembling in all respects alastrim. Alastrim is differentiated from variola by its epidemiological and clinical characters as well as its biological reactions. Thus, vaccination produces little immunity against it or none at all. An attack of alastrim does not protect from

inoculation with vaccinia. An attack of smallpox or of chickenpox does not protect against alastrim. Attacks of alastrim have been known to recur.

In experimental animals alastrim behaves differently to smallpox. No success in the inoculation of alastrim was obtained on rabbit, calf, sheep, goat or monkey, but the dry vaccine of the Belgian State Institute succeeded in all cases. Von Pirquet's method—repeated inoculations to create a state of sensibility—gave no result with alastrim in the monkey. Noguchi's intratesticular method was unsuccessful with alastrim in the monkey. Intracorneal inoculation of the rabbit (Paul's method) succeeded "more or less" in a single case, but the infection could not be transferred to a second rabbit. Intravenous inoculation to a monkey of pustular contents and brayed crusts of alastrim succeeded only when the skin was scarified or slightly traumatized. There is an evident affinity for the nerve centres and the integument. Pustules do not appear till the 9th day. The monkey is taken ill on the 6th or 7th. The human disease is faithfully reproduced. When the eruption appears the temperature comes down and the general state rapidly improves. These pustules and crusts can be inoculated per the skin into other monkeys—to the 8th passage. The incubation is reduced from 9 to 3 or 5 days. The pustules which now result are larger and like ordinary vaccine pustules. Generalization does not occur. The virus in adapting itself to the monkey becomes attenuated. The author has not been able to transmit the attenuated virus to rabbit or calf, but it can be inoculated to man, in whom it produces a pustule of vaccinal character and no generalization. On the other hand, attempts at variolization by means of pustules of alastrim have always given rise to more or less severe generalization.

A. G. B.

i. Cambessédès. **Variole ou alastrim.**—*Rev. Méd. et Hyg. Trop.* 1924. Apr. Vol. 16. No. 4. pp. 101–105.

ii. Henry. **Notes sur l'alastrim.**—*Ibid.* pp. 106–107.

i. An account of a case of alastrim seen at Paris in a coloured patient just landed from Martinique. Unless the patient became infected on the day of sailing the incubation period exceeded 14 days.

ii. Some general remarks on the disease which the author regards as attenuated smallpox.

A. G. B.

Chand (Wazir). **Analysis of 121 Cases of Lobar Pneumonia in the Prison Hospital, Nairobi, 1923.**—*Kenya Med. Jl.* 1924. Apr. Vol. 1. No. 1. pp. 8–17.

Consists chiefly of a series of tables with explanatory text. The Kikuyu, who are natives of Nairobi, suffered least and the Masai and Baganda most. The bulk of the cases occurred in the prisoners of terms between 1 month and 1 year, and in the months of August-October. Those who slept in tents suffered slightly more than those in barracks. There were 22 fatal cases. In the past four years 400 cases of pneumonia have occurred in this jail with 90 deaths. It is stated that overcrowding has been occupying the earnest attention of the medical authorities, but no data are given.

A. G. B.

REVIEWS AND NOTICES.

SÉGUY (E.). **Les Moustiques de l'Afrique Mineure, de l'Égypte et de la Syrie. Étude comparative des moustiques des régions méditerranéennes, de l'Europe centrale et septentrionale, leurs parasites suivi du Catalogue des Culicides néarctiques et paléarctiques.**—Encyclopédie Entomologique I.—257 pp. With 106 figs. 29 plates & 10 maps. 1924. Paris: Editeur, Paul Lechevalier, 12 rue de Tournon. [Price 45 francs broché, 55 francs carton.]

Though designed for the practical needs of those who wish to recognise the mosquitoes of a limited area of the globe this book is so generally instructive in its methods that it will be found useful everywhere, and particularly by the medical man who wants to get a sound working knowledge of mosquitoes for his own professional ends. It contains a multitude of well-executed figures, all of which are original, and it is particularly rich in information regarding breeding-places, eggs, and larvae. The classification too—though *de facto* not comprehensive—is natural, simple, and zoologically attractive. The author's attitude to jazz nomenclature, too, is eminently satisfactory: in these discordant cases the historic perspective is kept in view and the synonymy is given, but, in selecting a specific name for everyday use, precedence is given to a name that has become classical by graduation in a monograph and familiar by long currency, over an earlier—or conjecturally earlier—name that has been exhumed from long forgotten antiquarian records.

A. Alcock.

THE JOURNAL OF AYURVEDA, or the Hindu System of Medicine. Calcutta. 1924. July. Vol. 1. No. 1. pp. 1–38.

The objects of the originators of this Journal as set forth in the Introductory article are, when translated into plain language (1), to expound, to those who are unaware of them, the merits of the ancient Hindu system of Medicine, and (2) to impress upon some of its self-sufficient interpreters the simple truth that the system has to be reconciled with the scientific apparatus, if not also with the scientific experience, of the West. These objects are fairly focussed in an article on *Our Aims and Ideals*, by Captain Srinivasa MURTI, I.M.S., who expresses his belief that the best hopes for the future of Ayurveda are, not to rest content with its ancient doctrine, which in the course of time has become considerably obfuscated by some of its adherents, but to work in its spirit, making use of all the available resources of modern science in its efforts for the benefit of suffering humanity. An article entitled *Renaissance of Ayurveda*, by A. T. ROY, admits that "Ayurveda of the present day is tainted with the slough of empiricism for which a free use of the knife of reasonable criticism may be necessary" but is firmly opposed to unsympathetic criticism, and for the present looks for new life and light chiefly to the Chair for the study of Indigenous Drugs recently established in the Calcutta School of Tropical Medicine. An article on *Metals in Ayurveda* deals with the preparation and uses of mica as a therapeutic agent according to esoteric methods. Of the two remaining articles, one, entitled *A Brief History and Outlines of Ayurveda* is, so far as it goes, of the old-fashioned Aryan-legendary sort, and the other, with the fanciful title of *The Place of Bacteria in Ayurveda*, is a contemptuous disparagement of PASTEUR.

A. Alcock.

NOGUE (Mme. Maurice). **Les sages-femmes auxiliaires de l'Afrique Occidentale Française.**—Reprinted from *Bull. Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française.* 1923. Apr.–June & July–Sept. Nos. 2 & 3. 80 pp.

One turned to these pages expecting to learn something of the professional training, nature of the work undertaken and the results obtained by the auxiliary service of native midwives in French West Africa. There is, however, practically nothing of value in this direction. Madame Nogue is designated professor in the French West African School of Medicine, and informs us that in November 1918 Doctor LE DANTEC, who organized the school, confided to her the moral and intellectual training of the pupil midwives.

The brochure is best described as the collected but discursive reflections upon this side of the problem by a woman animated by enthusiasm and sympathy who has gained insight and understanding in dealing with the young native women who have come under her guidance. The theme, however, really belongs rather to the realm of pedagogy than tropical medicine.

H. S. Stannus.

LEWIS'S LIBRARY. **Supplement 1921-1923 to the Catalogue of Lewis's Medical and Scientific Circulating Library with Index of Subjects and Authors.**—86 pp. [Price 1s. net.]

This Supplement of 85 pages includes the titles (with the net prices) of about 2,300 books, arranged in the alphabetical order of the authors' names, together with a convenient subject-index. The subjects included are, besides all the main and ancillary branches of surgery, medicine, hygiene and medical education; agriculture, anthropology, archaeology, astronomy, biography, chemistry, dentistry, electricity, engineering, geology, hydraulics, manufactures, applied mathematics, metallurgy, meteorology, mineralogy, motor cars, philosophy, physics, psychology, relativity, sociology, statistics, surveying, telephony, textiles, travel, veterinary science, and many others of more limited interest.

A. Alcock.